

COMPUTERWORLD

RISC standard at stake

Compaq/Mips alliance could hobble Sun

ANALYSIS

BY J. A. SAVAGE
CW STAFF

There is more on the line than just a simple OEM contract in Compaq Computer Corp.'s reported search for a reduced instruction set computing architecture. With two rival architectures battling it out to create an industry standard, analysts and industry executives said a move by Compaq to popularize RISC systems could prove decisive.

The rivalry rages between Sun Microsystems, Inc., the dominant workstation vendor, and Mips Computer Systems, Inc. If RISC technology were to migrate to the personal computer level, Mips Comput-

er could "overtake or at least catch up to Sun," said David Brown, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

Compaq is intent on developing RISC systems and is apparently close to signing up with Mips Computer, according to users and analysts who said they have received various hints from company officials (see story page 103).

Although Sun had reportedly been bidding for Compaq's allegiance during recent months, Sun Chief Executive Officer Scott McNealy earlier this month belittled the prospect of the PC vendor competing in his company's backyard. Compaq "can't out-engineer us, and they have no

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Spring revamp set for AS/400

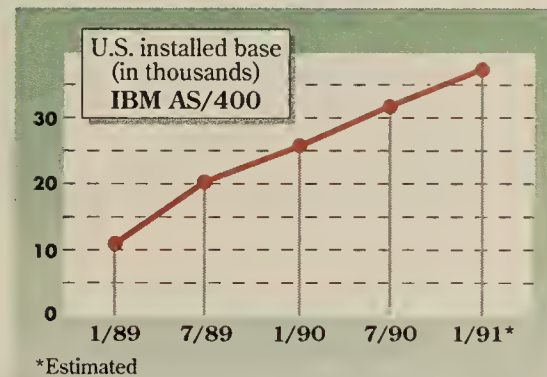
BY MARYFRAN JOHNSON
CW STAFF

In late April, IBM mid-range customers will get their first look at a "completely refreshed" line of Application System/400s as well as a new version of the OS/400 operating system, according to industry sources and customers briefed by IBM.

The AS/400 D models, based on new CMOS chip technology, will replace the entire B line with a price/performance boost running as high as 35% on some models. At the top of the line will be a dual-processor model 2½ times more powerful than the top-of-the-line AS/400 B70, which IBM rates at more than 53,700 transactions per hour. The new models will be equipped

Still going

The AS/400 continues to gain in popularity, showing threefold growth over two years



Source: Computer Intelligence

CW Chart: Marie Haines

with N-way architecture, enabling eventual growth to a six-way processor, sources said.

All of the new models are expected to be field-upgradable from the present machines, with IBM assuring compatibility for all applications.

The second version of the operating system will include multiprocessing capabilities and new features for higher availability as well as more cost-effective disk mirroring, according to customers familiar with IBM's plans. Also expected is the introduction of a new tape subsystem that takes advantage of 8mm helical-scan technology.

Some customers are watching for anticipated increases in software tier pricing with no small measure of dread.

Rick Hollahan, network manager at Georgia-Pacific Co. in Atlanta, said users with the first version of OS/400 will not be charged for an upgrade to the second one. However, he said,

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No user rush for Windows applications

BY JAMES DALY
CW STAFF

Windows 3.0 has been a gold mine for Microsoft Corp. since its introduction last May, but it has not yet generated a similar financial windfall for developers who built applications specifically designed for the graphical user interface.

However, resellers said the flock of so-called "killer" Windows applications expected by year's end could create a powerful slipstream that will draw in users who have bought Windows 3.0.

So far, most Windows users are apparently content to run their old applications under it.

"The motivation to buy some of the new applications is just not there yet," said Steve Asche, director of sales and marketing at the Computerland Corp. retail chain in Pleasanton, Calif.

Users said their hesitancy stems from fiscal rather than emotional concerns.

"We've got a tremendous amount of money and training tied up in the older applications, so for now, we're stuck with them," said Ron McCarty, senior management consultant at Avis Car Leasing in Hunt Valley, Md. McCarty uses Windows 3.0 as a front end to a series of older DOS-based spreadsheet and

Continued on page 8

LAN users shun IBM's route to SNA connection

BY ELISABETH HORWITT
CW STAFF

IBM is expected to announce a key component of its local-area network integration strategy next month: an OS/2 version of its Advanced Peer-to-Peer Networking platform. However, few LAN users have bought into the peer-to-peer LU6.2 and PU2.1 networking protocols APPN rides on.

APPN is the basis of a distributed computing strategy that promises users transparent access to all of IBM's Systems Application Architecture computing resources across a multinode network. As APPN nodes, OS/2 servers will be able to act as intermediaries between OS/2 and DOS clients on their own LANs and other resources throughout the enterprise, IBM said.

However, many LAN users

seem to eschew Systems Network Architecture backbones in favor of routers from companies such as Cisco Systems, Inc. and Wellfleet Communications, Inc.

Forrester Research, Inc. and Ernst & Young both estimated that SNA traffic over wide-area networks is growing at a rate of about 10% per year. However, they said, multiprotocol router traffic is doubling each year.

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Parlez-vous ASCII? You may not have to!

BY JOHANNA AMBROSIO
CW STAFF

MOUNTAIN VIEW, Calif. — An Esperanto for the electronics age arrived last week when a group of computer vendors announced a coding standard to

help computers speak many national languages.

The consortium, called Unicode, Inc., includes IBM, Apple Computer, Inc., Microsoft Corp., Sun Microsystems, Inc., Lotus Development Corp. and Xerox Corp. among others. The group will propose that its standard, also called Unicode, be adopted by standards organizations in hope that it has more success than the ill-fated Esperanto universal language.

However, users said, computer systems need to do much more than simply be available in different languages to be truly

multinational. In areas from accounting to operating systems, users said, they have learned the hard way that software has to take into account legal, cultural and even religious differences to support companies' needs in different countries.

For now, though, the new coding standard may break through an important set of barriers. Currently, formats such as ASCII are based on 8-bit code and allow for 256 characters, although languages such as Japanese require many more.

Unicode is based on a 16-bit

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INSIDE



George Lange

The CEO View, a new feature on how top execs perceive information technology. This month: Fred Smith of Baldrige award winner Federal Express. Page 61.

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105 Rather than posing a threat, IBM's ties with Novell are apparently strengthening some users' determination to stick with **Banyan**.

Quotable

"Common sense isn't very common and often makes little sense."

KEN MATEJKA
AUTHOR

From his book on managing and motivating employees. See book review page 63.

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EXECUTIVE BRIEFING

■ Federal Express Chief Executive Officer Frederick Smith credits information technology with the highly rated service that won his company a Malcolm Baldrige National Quality Award. In the first installment of a new monthly series on CEOs' views of information systems, Smith says technology's goal should always be improved quality. He says he also believes in focusing technology spending on "high leverage points" where investments can be justified. **Page 61.**

■ A new IBM Application System/400 and midrange operating system will be shown to customers this spring. The new D models are based on CMOS chip technology and boast price/performance increases of up to 35%. Some users, however, are concerned about paying more for new operating system licenses if they upgrade to more powerful models. **Page 1.**

■ DEC goes back to the future with new VAX 9000 mainframes customized for its traditional buyer base: technical and scientific users. This time, DEC is aiming to take sales away from Convex and Cray Research. **Page 4.**

■ An international coding standard has been proposed by a vendor consortium. The 16-bit standard allows coding in complex languages such as Japanese. But users in global corporations say software must also overcome cultural as well as language barriers to be truly international. **Page 1.**

■ To get the most from your information technology investment (and keep your job), you must know where your dollars are going. Consultant Peter G. W. Keen, in an excerpt from his upcoming book *Shaping the Future*, offers suggestions on how to tally and explain the real costs of upkeep and expansion. **Page 77.**

■ Resolution Trust Corp. is admonished again for its slow pace in developing information systems. A GAO official says the agency responsible for resolving the thrift crisis has failed to show how its systems will integrate. **Page 10.**

■ Apple Chairman John Sculley scoffs at the idea that Windows on IBM Personal Computers will threaten Macintosh sales. In a speech in Tokyo, Sculley said Windows indicates that the computer industry believes in graphical user interfaces. **Page 8.**

■ Smaller IS shops in health care may be ahead of their larger brethren in moving toward open systems. At a recent conference, larger mainframe-bound health care institutions were accused of suffering from "paradigm paralysis." **Page 61.**

■ Opportunities for disaster recovery planners abound as companies realize misfortune could strike them. **Page 90.**

■ CASE growth in IS organizations is slower than consultants expected, and improper training is one big reason why. **Page 100.**

■ Companies are leasing used equipment at substantially lower prices, according to the CDLA/Gartner Group 1990 leasing industry survey. **Page 96.**

■ On-site this week: Niagara Mohawk Power moves some applications from an IBM 3090 to an IBM LAN, where users can access data faster, cheaper and better. **Page 52.** Pick-compatible database management software from Prime helps Sacramento, Calif.-based Aerojet bid on a \$1 billion space shuttle engine contract from NASA. **Page 29.** After four years of use, CASE technology is producing improved applications at Mass Mutual Life Insurance. **Page 29.** High tech meets ancient times in Brooklyn, N.Y., where a PC-based error-checking system scans hand-lettered Hebrew Torah scrolls to ensure their required perfection for prayer services. **Page 41.**

The 5th Wave



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DEC airs cheaper VAX 9000

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. is scheduled to announce five new, lower priced models of its mainframe VAX 9000 this week in a bid to attract more technical, scientific and government customers.

By stripping away additional memory, consulting services, storage adapters and the commercial instruction set, DEC produced a specialized server VAX 9000 aimed at users who now buy from Convex Computer Corp. or Cray Research, Inc.

Priced at \$920,000, the VAX 9000 Model 110 is a \$400,000 savings over the Model 210's price tag. The four models in the 300 series range from \$1.4 million to \$3.7 million.

"The [Model] 110 is still not inexpensive, though it certainly is an improvement over what you might be looking at with a fully loaded model," said Paul Stieman, associate vice president for computing and information services at the University of Pittsburgh.

With its diverse user community, the university could be a candidate for the commercial and server VAX mainframes, he

said. "We continue to see our demand for mainframe services grow at 30% to 40% per year, even with the dramatic demand for PCs and workstations."

While DEC officials said VAX 9000 models are "broadening

tract users looking to upgrade Vaxcluster performance with a less expensive machine, Schay added.

He said the move was an "appropriate one" for DEC to make with its VAX 9000 line.

Technical users with numerically intensive applications may have to add back in the memory that DEC stripped out, some customers said.

"Stripping memory may get the price down, but considering DEC's memory cost [of \$1,695 per 1M byte], maybe this just opens the market for third-party vendors," said Jen Louie, a senior programmer/analyst at Synergy, Inc. in Washington, D.C.

As an engineering research and development contractor working primarily for the U.S. Department of Defense, Synergy had packed its VAX 9000 Model 210 "with a lot more memory than the base model," Louie noted.

The mainframe was destroyed in a freak flooding accident last November, however.

No excess baggage

By stripping out the commercial instruction set, vector processing, consulting service and storage adapters, DEC has created lower priced server models of the VAX 9000

| SYSTEM | PRICE | MEMORY |
|--------------------|-----------|------------|
| VAX 9000 Model 110 | \$920,000 | 128M bytes |
| VAX 9000 Model 310 | \$1.41M | 128M bytes |
| VAX 9000 Model 320 | \$2.43M | 256M bytes |
| VAX 9000 Model 330 | \$3.15M | 512M bytes |
| VAX 9000 Model 340 | \$3.69M | 512M bytes |

CW Chart: Marie Haines

their market" rather than simply cutting the entry price point, some analysts were skeptical. "This is nothing but a repackaging exercise to get the price down," said Peter Schay, an analyst at Gartner Group, Inc. in Stamford, Conn.

The new models should at-

IBM enhances high-end tape drive capacity, discards 3380

BY ROSEMARY HAMILTON
CW STAFF

IBM trotted out a second generation of high-end tape drives last week that offer twice the capacity of the current 3490s and will eventually come with full support of IBM's fiber-optic channel architecture, Escon.

At the same time, the company announced the official death of the 7-year-old 3380 tape drives. Support for the commonly used A22 and B22 models will be withdrawn in May. IBM also announced two revamped releases of its system-managed storage software products.

Large system users contacted last week said the new 3490s, which IBM is referring to as 3490 Enhanced or E models, should provide a boost in tape management by reducing manual intervention. Because enhanced recording techniques will allow each tape cartridge to hold so much more data — up to 1.2G bytes — a user will be required to change tapes less often.

"This product has a lot of creative ideas, and it looks like someone thought a lot about it," said Tom Loane, vice president of information systems at Alamo Rent A Car, Inc. based in Fort

Lauderdale, Fla.

There is one glitch that may hit users who are expecting to quickly move into the Escon world. Although IBM said basic Escon support will be available in June, the full-blown Escon features will not be available until

"There may be a perception that the I/O time will be cut in half, but that won't be the case until the fourth quarter," said Thomas Meehan, a vice president at Innovation Data Processing, Inc., which sells backup software for IBM MVS environments.

A key aspect of the new drives is IBM's continued use of its Improved Data Recording Capability, which was a standard feature with the older 3490s.

Race to the tape

New IBM tape cartridge units offer twice the storage capacity and will double the transfer rate when full Escon support arrives

| 3490s | Price | Availability | Escon feature/Availability | Capacity per cartridge | per unit |
|---------|----------|--------------|--|------------------------|-------------|
| Old A01 | \$56,460 | Oct. '89 | Fiber, distance/June '91 | 600M bytes | 28.8G bytes |
| New A10 | \$62,100 | April '91 | Fiber, distance/June '91 9M byte/sec. transfer/4Q '91 | 1.2G bytes | 57.6G bytes |

Source: IBM

CW Chart: Paul Mock

sometime in the fourth quarter.

IBM said it will provide an Escon attachment in June, which will allow users to connect the tape controller to a fiber channel and achieve the greater distances that Escon provides.

However, IBM will not follow up with a feature that provides the faster Escon data transfer rates of 9M byte/sec. until sometime later in the year.

This enables IBM to load cartridges with millions of more bytes of data and is a technique that most IBM competitors have not capitalized on as much, said Robert Abraham, a vice president at Freeman Associates, Inc., a market research firm in Santa Barbara, Calif.

"IBM appears to be a little more than a step ahead now," Abraham said.

AS/400

FROM PAGE 1

"the 'gotcha' is that if you're going from a model B50 to a D50, that performance increase will jack you into a new tier, and the pricing will get you there."

Users who keep their older models but move to the new version of the operating system will not be charged an upgrade fee, but a version of OS/400 expected in late 1992 will require upgrade fees from all customers.

"What we're discussing heavily with IBM is the issue of how long they're going to maintain the older version," said George Perera, group director of MIS at Ryder Truck Rental, Inc. in Miami and a member of the AS/400 Customer Advisory Council. Larger users are asking for at least one year of maintenance, while IBM wants to limit it to six months, Perera said.

"How they package it and price it makes a real difference to us," said Dennis Klinger, vice president of MIS at Ryder, which has a network of at least 100 AS/400s. "If this is a replacement line and you have re-

SOME CUSTOMERS ARE watching for anticipated increases in software tier pricing with no small measure of dread.

maining accounting life in [earlier models], you have to write those down, and it could mean a cost to you."

IBM has been fielding harsh criticism from some of its largest users about the reliability and uptime of the AS/400, Perera said. "The advisory council really hit IBM severely on the fact that availability, reliability, fault tolerance and quick uptime are the highest priorities we have on the AS/400," he said.

Another concern is the expense of disk mirroring, a capability IBM provided in a new release of OS/400 last August. This option proved to be too expensive for most users, Perera said, because it required the purchase of two machines to guarantee the uptime of one. "In OS/400 Version 2, there will be a more compact utilization of [direct-access storage device] for the disk, so IBM is addressing that," he added.

From an applications point of view, the new multiprocessing capabilities in OS/400 will present a single image to systems operators, with shared access to both memory and buses. When one processor is running at full capacity, work will be off-loaded to the companion processor by the operating system.

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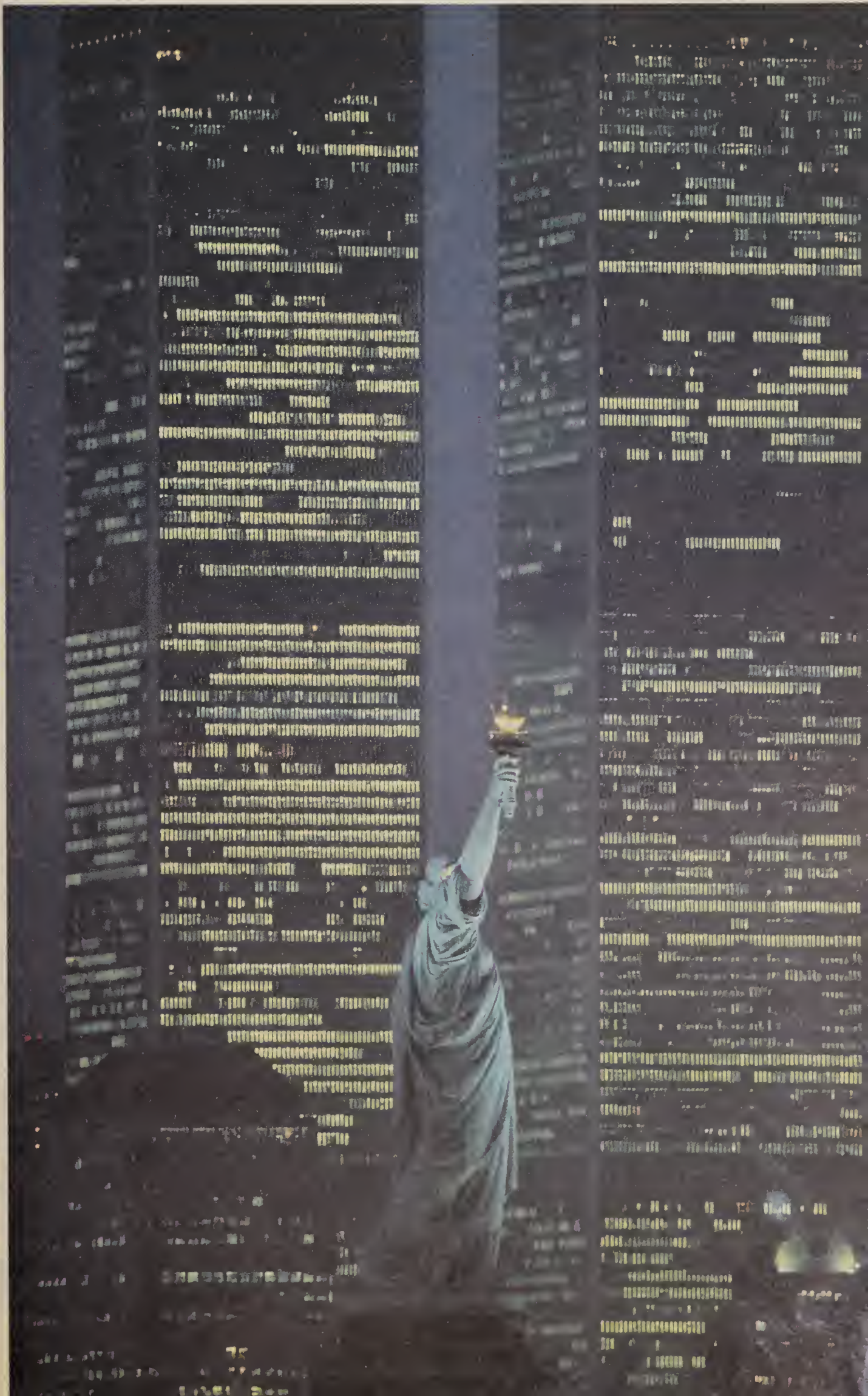
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NEWS SHORTS

Manny Hanny's Nyce to step down

Veteran Manufacturers Hanover Trust Co. information systems boss H. Edward Nyce will retire next year, the bank confirmed last week. Nyce joined the company in 1973 and was named executive vice president of information technology services in 1986. Nyce has not yet chosen a successor.

Weyerhaeuser group on the block

Innovis Interactive Technologies, whose flagship software product lets home improvement buffs design and spec projects ranging from simple shelves to decks and garages on-line in the lumberyard or hardware store, is on the block — a victim of corporate parent Weyerhaeuser Co.'s back-to-basics drive.

Microsoft redoes Office

Microsoft has begun shipping an updated version of its Office for Windows business applications package that includes its recently released Excel 3.0 spreadsheet. The Version 1.5 suite of applications also includes Word for Windows and Powerpoint and will sell for \$995. Current Office users may upgrade for \$129, while those who bought the package after Dec. 7 will receive the upgrade free, Microsoft officials said.

NCR to add terminal servers

NCR Corp. has signed a \$60 million three-year contract with Xylogics, Inc. to incorporate Xylogics' Annex Three terminal server into the NCR System 3000 Unix-based computer. Terminal servers connect terminals or other devices to networks and allow them to access multiple computers. Annex Three, which was announced last week, supports Transmission Control Protocol/Internet Protocol (TCP/IP) and Digital Equipment Corp.'s Local Area Transport protocol.

IBM, Coopers pair on consulting

IBM and Coopers & Lybrand joined forces last week to create Meritus Consulting Services, a company that will provide management consulting services for consumer package goods and pharmaceutical/health care supplies companies. The two companies will share equal ownership of the new entity, which will be located in Greenwich, Conn.

Cognos releases OS/2 port

Cognos, Inc. announced that it is porting Powercase, its computer-aided software engineering (CASE) software, over to the OS/2 platform. The firm said the software is the first CASE tool integrated in both a fourth-generation language environment and ANSI-standard SQL relational databases.

Express to MCI

MCI International, Inc. has signed an agreement with Lotus Development Corp. that gives MCI development and marketing rights to Lotus Express. The communications software package allows users to receive and send messages, spreadsheets and documents and includes message management capabilities. MCI and Lotus, which retains ownership of Express, have co-marketed the product since 1987. Under the new arrangement, MCI will be responsible for supporting the product and will issue a new release of Express before year's end.

DEC backs protocol

Digital Equipment Corp. plans to announce today that it has joined six internetworking vendors in its support of the Intermediate System-to-Intermediate System (IS-IS) routing protocol, a proposed standard for TCP/IP and Open Systems Interconnect (OSI) networks. IS-IS allows network administrators to install routers from different vendors under one routing scheme that determines the paths taken by TCP/IP and OSI packets through the network simultaneously. DEC will reportedly be conducting IS-IS interoperability tests with other router vendors supporting IS-IS.

More news shorts on page 104

Write-once technology still too costly for most

BY MAURA J. HARRINGTON
CW STAFF

Rick Harley made the switch about one year ago, moving from magnetic disk drives to write-once compact disc/read-only memory (CD-ROM) storage.

"We had so much paper, we were buried in it. Now we store almost 100G bytes of data on write-once CD-ROMs, using Windows 3.0 as our front-end filing system format," said Harley, information systems manager at Complete Health Co. in Birmingham, Ala.

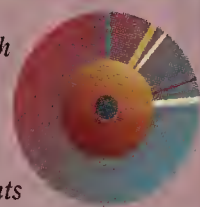
Write-once technology is becoming increasingly popular for IS shops and software companies that can afford the higher costs or for whom cost is not as important as having access to write-once CD-ROM drives. Still, even those users need improved standards, such as a compatible user interface from disc to disc, said analyst Bob Katzive, vice president at Disk/Trend, Inc., a market research firm based in Los Altos, Calif.

To that end, the CD Write-Once Ad-Hoc Division — also known as the Frankfurt Group — is expected to introduce write-once CD-ROM specifications at next month's Microsoft Corp. CD-ROM conference. Those specifications could set guidelines for allowing users to

write to a CD-ROM, said Fred Meyer, president of CD-ROM manufacturer Meridian Data Corp., who sits on the newly formed standards committee led by Sony Corp. and Philips Telecommunications N.V.

Not so fast

Despite a healthy growth rate, shipments of compact disc/read-only memory drives are still relatively small compared with shipments of personal computers



| | Worldwide CD-ROM drive shipments | Worldwide PC shipments |
|-------|----------------------------------|------------------------|
| 1989 | 375,000 | 21.6M |
| 1990 | 500,000 | 23.6M |
| 1991* | 750,000 | 26.2M |
| 1992* | 1,100,000 | 29.1M |
| 1993* | 1,600,000 | 32.5M |

(Number of titles at year's end 1990: 2,700)
*Projected

Source: Helgeson Associates, Inc. and International Data Corp.

Write-once CD-ROM technology is a method of producing customized prototype or very small-volume CD-ROMs instead of stamping the more generic information onto a disc, as is done with the mass-produced CD-ROM discs found in retail stores, Katzive said.

While the cost of write-once CD-ROM technology has fallen

from \$100,000 to about \$40,000 for a customized in-house production system in the past year, Katzive said, it will nevertheless be at least five years before IS managers find write-once technology inexpensive to use because of standards problems.

The Frankfurt Group's standard specifications would allow users to write data to the CD-ROM in sections or blocks rather than all at once, Meyer said. This would be an addition to the International Standards Organization's "Orange Book" specifications — CD-ROM standard specifications written a few years ago by the High Sierra Group, he added.

"Our main objective is to make writing to a CD-ROM as seamless to the end user as writing to a floppy disk is today," Meyer said. "I think that we are about a year away from that goal."

However, Katzive and analyst Kathryn Hilton at San Jose, Calif.-based Dataquest,

Inc. said other issues must be addressed before producing write-once CD-ROMs in the back room of the IS shop becomes commonplace.

"CD-ROM technology is growing, but it is still too expensive, and there are not enough standards established yet to make it a mainstream product," Hilton said.

ASCII

FROM PAGE 1

system, allowing for 65,536 characters to be represented. So all the characters of all the languages of the world will be able to have their own computerized code. Thus far, Unicode has defined 27,000 characters.

There are problems, however. For one, the 16-bit system requires more memory and storage capacity than did the 8-bit systems.

Also, Unicode is practical for the development of new software but requires translation to work with the installed software base. To that end, the group has compiled a database of conversion tables between Unicode and other character encoding standards such as ASCII.

Hard to account for

Because they are by nature complex, accounting systems are especially tricky in a multinational environment. They have to handle the legal requirements of both the country being reported on and the country the corporation is based in and support multiple currencies as well as things such as hyperinflation.

JoBette McCann, vice president of systems and development at LBI Trading, Inc. in New York, recalled the problems she encountered at Paine Webber, Inc. when the securities firm was implementing a global trading system.

Each country had its own accounting system, McCann said, so everything was done manually and shipped back to headquarters.

"It was labor-intensive and created redundant data," she said. Even seemingly simple things were difficult, such as the size of the fields used to enter data. "They weren't large enough to accommodate some currencies," she said.

Cultural and religious practices also need to be considered. In countries where polygamy is legal, just one allotted space under "spouse" will not do.

Also, in Middle Eastern nations, it is considered unconscionable to charge interest, so that item is best left off the balance sheet.

New York-based Sterling International, which has 70 locations worldwide, used to need at least eight days to close its books, according to Bernard J. Brisendine, Sterling's area di-

rector of MIS. With a multinational accounting package from Systems Union, Inc. in New York, that time frame has been reduced to two days.

Still, in most applications areas, there is a dearth of multinational packages. Brisendine said his company is still searching for a manufacturing resource planning package to use worldwide.

Nothing is immune

Nor is it just applications that require this focus. Michael Braude, senior vice president at Gartner Group, Inc. in Stamford, Conn., said that virtually all software — including database management systems, operating systems, computer-aided software engineering packages and systems management tools — needs to be revamped.

Brian Sommer, director of software intelligence at Chicago-based Arthur Andersen & Co., said most of what is available comes from European-based vendors. "North American vendors have ignored this problem until very recently, but for European vendors, it's a matter of survival. They have to do business in different countries, so they build these features in as a matter of course."



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Developer shift to Windows puts IBM OS/2 in quandary

BY PATRICIA KEEFE
CW STAFF

IBM's OS/2 plans are mired in a catch-22 that developers said may have already killed OS/2 on the desktop.

IBM is painfully aware that developers are not building OS/2 applications because users are turning to Microsoft Corp.'s Windows — and because there are few OS/2 packages. In a recent interview, Lee Reissig, assistant general manager at IBM's Programming of Entry Systems Division, conceded that he has to prove to developers that OS/2 is worth their time.

It is imperative that IBM find a way to wrest developer attention away from Windows. How IBM plans on doing that is unclear, but the consensus among developers and analysts is that it is going to be a tough sell.

User enthusiasm for Windows has not been lost on developers such as David Proctor at Ashton-Tate Corp. and Fred Gibbons at Software Publishing Corp. (SPC).

Proctor, who is general manager of the database division, said his top priority this year is to get a Windows version of Dbase out the door. OS/2 is not even his second priority — support for Apple Computer, Inc.'s Macintosh is. An OS/2 package is a possibility in 1992, he said.

Gibbons, president and chief executive officer of SPC, strongly endorsed OS/2 as the way to go on the server. But for the desktop user, "currently, there is simply no more attractive or painless path to a graphical user interface than going with Windows," he said.

Infoalliance, SPC's client/server environment, initially shipped running on OS/2, but because of customer requests, a

Windows client will be released this summer. Today, SPC, once a strong proponent of OS/2, is advocating Windows on the client and OS/2 on the server.

"The question to ask IBM is if they hope to capture the desktop from Windows, what are they doing to make OS/2 more convenient and easier for users?" Gibbons asked.

"They haven't made that effort," said Stan Levine, a vice president at Automated Design Systems.

IBM could start by taking a few tips from Windows. Levine noted that Windows comes bundled with a number of client-oriented tools — "all the friendly things that IBM left out of Presentation Manager." These include a card file, terminal emulator, paint box and file manager. In addition, loading OS/2 "is a serious operation," Levine said.

Windows also provides users with a level of application consistency that OS/2 lacks, said John Dunkle, an analyst at Workgroup Technologies, Inc. It is necessary to switch out of Presentation Manager when using the Communications Manager or Data Base Manager, he said.

For developers, the issue is one of economics. "We will all jump through hoops if the brass ring is big enough. I just don't see OS/2 being as compelling a case as is Windows on the desktop," Gibbons said.

The issue is also one of confusion. Developers and users are still waiting for a show of unity between Microsoft and IBM, said Mike Sherwood, Page-maker product manager at Aldus Corp. "So much stuff is up in the air from Microsoft. Do you write to Presentation Manager or to 32-bit Windows, and will it be New Technology OS/2-compatible?"

Windows

FROM PAGE 1

word processing packages.

In a tight economy, developers must stretch their creative boundaries if they hope to get users reaching for their checkbooks. "Users must be convinced that the quality of the newer Windows packages is significantly better than their DOS counterparts," said Jesse Berst, publisher of the "Windows Watcher" newsletter in Redmond, Wash.

Despite the uphill struggle developers face, sales of Windows 3.0 applications are nothing to be sniffed at. According to the Software Publishers Association (SPA), the firms offering Windows 3.0 applications rang up close to \$140 million in sales during the third quarter of 1990, nearly equaling the software sales for Apple Computer, Inc.'s Macintosh. The figure repre-

sents a whopping 213% growth over results from one year earlier.

Several recently released applications should further enhance those sales. Microsoft Word for Windows and the Excel 3.0 spreadsheet from Microsoft have gained early accolades, as has Corel Systems Corp.'s Coreldraw 2.0 graphics tool.

Other products expected to generate buyer interest are Lotus Development Corp.'s 1-2-3 for Windows, expected in June; Aldus Corp.'s Persuasion presentation package, expected next quarter; Wordperfect Corp.'s word processing package for Windows, due within the next few months; and a summer update of Word for Windows.

Resellers said the release of these key applications will ignite the market's latent potential. "It's sort of like waiting for your favorite movie to come out on video, but this time everyone is waiting for their favorite applica-

tion to come out on Windows," said David Weiss, director of software at Merisel, Inc., a computer products distributor in El Segundo, Calif.

However, once those applications arrive, users said, there is often still a lot of tough slogging between the product's purchase and widespread implementation.

Officials at Hughes Aircraft Co. in Long Beach, Calif., have already approved the switch to Microsoft Word for Windows, but upgrading the 30,000 personal computers installed in the massive site is a process "that could certainly take years," said Jack Baumann, manager of the end-user consulting department at Hughes.

Despite the rapid growth expected in the Windows 3.0 applications market, large functional gaps still need to be filled. According to SPA data, there is a notable absence of database and spreadsheet applications in the Windows environment.

Sculley: Windows no damper on Mac

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — The million dollar question for Japan's Apple Computer, Inc. Macintosh watchers is likely the same heard elsewhere in the world: How will Microsoft Corp.'s Windows 3.0 for IBM Personal Computers and compatibles impact Apple's fortunes? Apple Chairman John Sculley said that after nine months on the market, Windows has not dampened Macintosh sales but has boosted enthusiasm for the concept of graphical interfaces.



Apple's John Sculley claimed Windows has had little effect on Mac use

"MS-Windows is a statement that the rest of the computer industry believes in the future of graphics," Sculley said, adding that users of Windows and the Macintosh are quite different: Users of MS-DOS and Windows have specific applications, while Macintosh users employ the system for all applications under a common interface.

Sculley declined to discuss details of another hot topic, the Apple notebook computer. However, he did say Apple would release a notebook model before year's end.

Although rumors persist that Apple is talking with both Sony Corp. and Toshiba Corp. to buy display technology, Sculley would not comment on any discussions. He did, however, say Apple would be getting its screen technology from Japan.

Sculley said punitive tariffs that may be imposed on imported Japanese flat-panel displays [CW, Feb. 18] will hurt more than it will help U.S. industry's competitiveness. "There has been a pattern in the U.S. that started a few years ago — first with the 256K [-byte dynamic random-access memory] and now with flat-panel displays — that a small group of companies who make and sell parts has lobbied politicians and ended up holding the computer industry as hostages," Sculley said.

Valigra is the Tokyo bureau chief for the IDG News Service.

HIGH-TECH BATTLEFIELD



The Theater Display Terminal is a Sun Microsystems, Inc. workstation with software that displays strategic missile launches on a world map — the kind of large-scale attack expected in a global nuclear war. However, it was not well-suited for a war in the Middle

East, where the symbol for a missile launch would cover up five countries on the world map.

At the request of battlefield commanders, the U.S. Air Force Space Command came up with a software fix to accurately display a small-scale launch like the Iraqi Scud missile attacks on Israel, according to a Pentagon source. In the space of five days, about 300 lines of Ada code were extracted from another program, integrated within the terminal's software, tested, flown to the war zone and used for the first time during one of the

earliest Scud attacks, the source said.

If the U.S. Army's battlefield data centers look a little funny, it is only because they have to be transportable both in the air and on the ground. The logistics and support computers are housed in three truck-mounted, rigid-walled shelters, with each shelter connected to the others by a fiber-optic cable for data communications.

The shelters cover Unisys Corp. U5000 multiprocessor systems, which are based on the Motorola, Inc. 68020 chip and run AT&T's Unix System V operating system, a Unisys spokesman said.

Portable telephones from Taiwan's Microelectronics Technology, Inc. (MTI) have become a secondary means of communication for reporters and dignitaries caught in the Persian Gulf war zone, IDG News Service Correspondent Chris Brown in Taiwan reported.

MTI's portable phone, which folds up into a 65-pound suitcase, comes with an umbrella-like antenna and bounces signals off the Marisat satellite system. It lets a user place calls from any location — "as long as you can see the sky," MTI President Chi Hsieh said.

Compuadd Corp. in Austin, Texas, which has already shipped \$21 million worth of microcomputer hardware and software to the U.S. Central Command in Saudi Arabia [CW, Feb. 18], said last week it has received a \$10.4 million add-on contract. The new order includes Intel Corp. I486-based desktop systems, 80386SX laptop personal computers and ruggedized carrying cases. The order was funded by Japan.

Operation Desert Storm apparently has a big appetite for telecommunications equipment and circuits. The Defense Commercial Communications Office, located at Scott Air Force Base in Illinois, has signed 603 telecommunications contracts for Desert Storm so far, with monthly charges for these contracts amounting to \$3.1 million, a spokeswoman said.

Compiled by National Correspondent Mitch Betts.

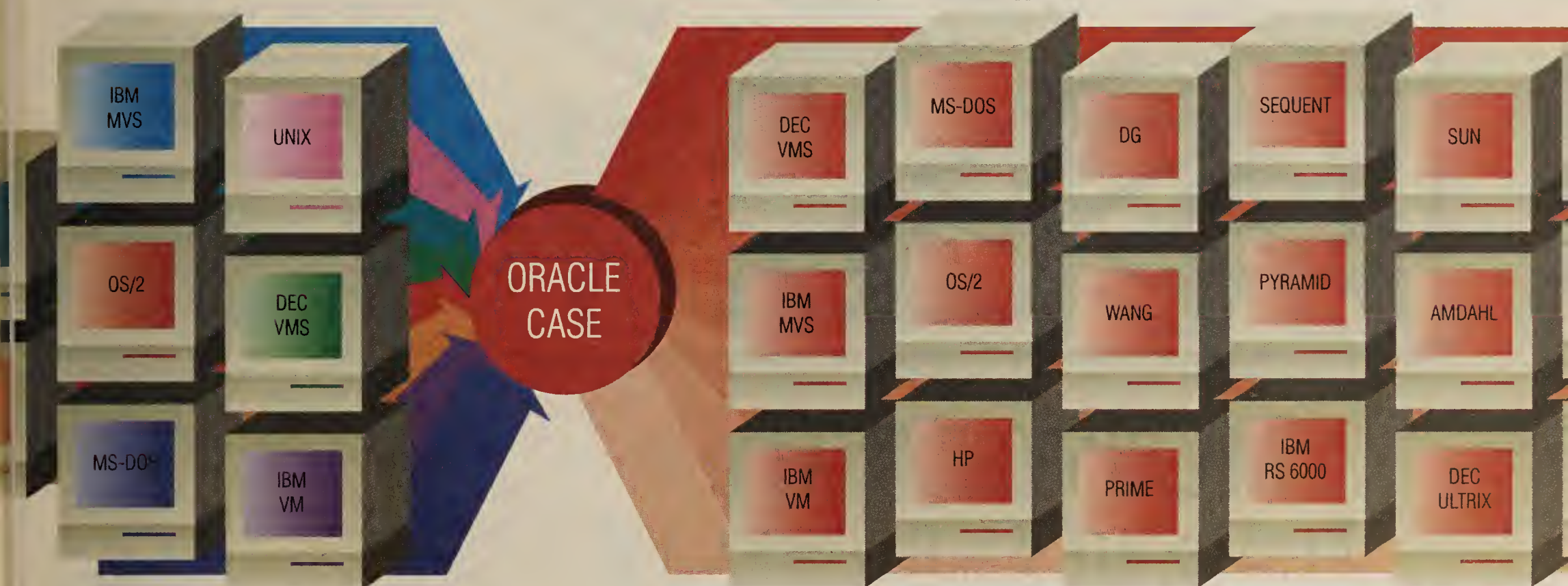
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Alliant unveils enhancements, low-end model

BY SALLY CUSACK
CW STAFF

LITTLETON, Mass. — Alliant Computer Systems Corp. announced several enhancements last week to its reduced instruction set computing (RISC)-based FX/2800 supercomputer family, and it also introduced the FX/800, an entry-level supercomputer system for distributed computing environments.

The six high-end enhancements were specifically developed for I/O- and data-intensive applications, the company said. They include the following:

- Support for the ANSI X3T9.3 High Per-

formance Parallel Interface (Hippi) standard for high-performance I/O connection capabilities. Up to five pairs of I/O Hippi channels are supported on the FX/2800.

- Increase in the FX/2800's main memory capacity, from 1G byte to 4G bytes.

- Support for Intelligent Peripheral Interface 2, or IPI-2 disk drives, which double the single-disk transfer rate of the FX/2800 family.

- Software interface support for multiple large-scale disk arrays. Each disk array provides 51.2G-byte capacity, allowing the FX/2800 series to provide more than 500G bytes of mass storage using these devices.

- Fiber Distributed Data Interface networking support.

- A system resource accounting function to allow systems administrators to charge users for the use of various system resources, including CPU time, disk I/O and connect time.

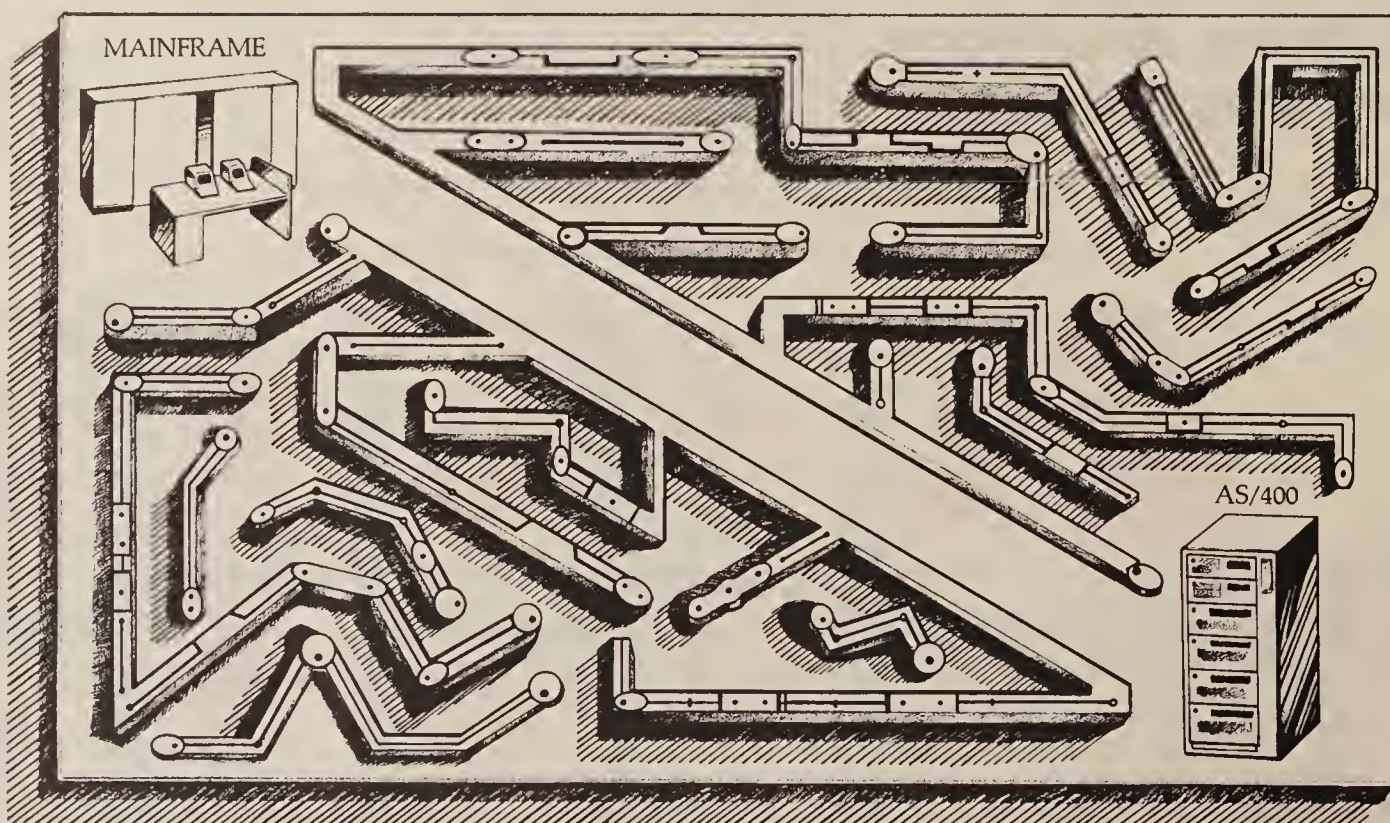
Omri Serlin, editor of the monthly newsletter "Serlin Report on Parallel Processing," noted that although Alliant was once fairly heavy into national laboratories and research facilities, the company is now aiming at the commercial supercomputing market.

Serlin estimated that 40% of the company's revenue is now coming from indus-

trial accounts instead of universities and national laboratories. Alliant lists among its customers Arco Oil & Gas, Sandoz Pharma AG and the San Diego Supercomputer Center.

The new FX/800 system is targeted at distributed environments in which central FX/2800s are surrounded by clusters of "satellite" FX/800 systems connected via high-speed networks, the vendor said.

The FX/800 reportedly offers a peak performance of 320 million floating-point operations per second, supports two to eight processors and offers up to 500M byte of memory. It is priced from \$189,000 to more than \$600,000. The FX/2800 can support as many as 28 processors and provides as much as 4G bytes of memory. Pricing starts at \$525,000.



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Fed agency's IS under fire again

BY GARY H. ANTHERS
CW STAFF

WASHINGTON, D.C. — The federal agency given the job of unloading billions of dollars in assets from dead and dying savings and loans was again taken to task last week over its progress in developing internal information systems.

Resolution Trust Corp. (RTC) has made "disappointing" progress, Charles A. Bowsher, head of the U.S. General Accounting Office (GAO), told a U.S. House of Representatives committee last week.

RTC had developed a strategic plan and architecture for IS, as the GAO had earlier recommended, but had failed to show how data will flow and how various systems will fit together, Bowsher said. "[RTC] still runs the risk of acquiring costly technology that won't meet its needs," he added.

A spokeswoman for RTC said the agency had no comment on the GAO testimony but would present its views at an upcoming hearing that had not yet been scheduled by the House committee.

RTC recently awarded IBM a \$14 million contract to develop a system to manage and track real estate assets, but Bowsher questioned whether it will be able to "roll up" asset data with data from other systems for management review.

Extensive burdens

Bowsher also said management requests for information cause extensive reporting burdens on RTC field staff. He cited a GAO survey in which 70% of respondents said reporting requirements were excessive, and 80% said they were duplicative.

Half of the top field managers responding to another GAO survey said RTC had "ineffectively communicated policies and procedures on information systems development." As a result, they said, "field offices have independently developed and acquired numerous manual and automated processes." This unfocused approach is likely to continue until RTC has developed a comprehensive IS plan covering all levels of the agency, Bowsher said.

Bowsher gave RTC mixed marks for its performance to date, in part blaming IS lapses for its problems. In particular, Bowsher found fault with RTC's progress in selling real estate assets, although he acknowledged that the real estate slump had made RTC's task more difficult.

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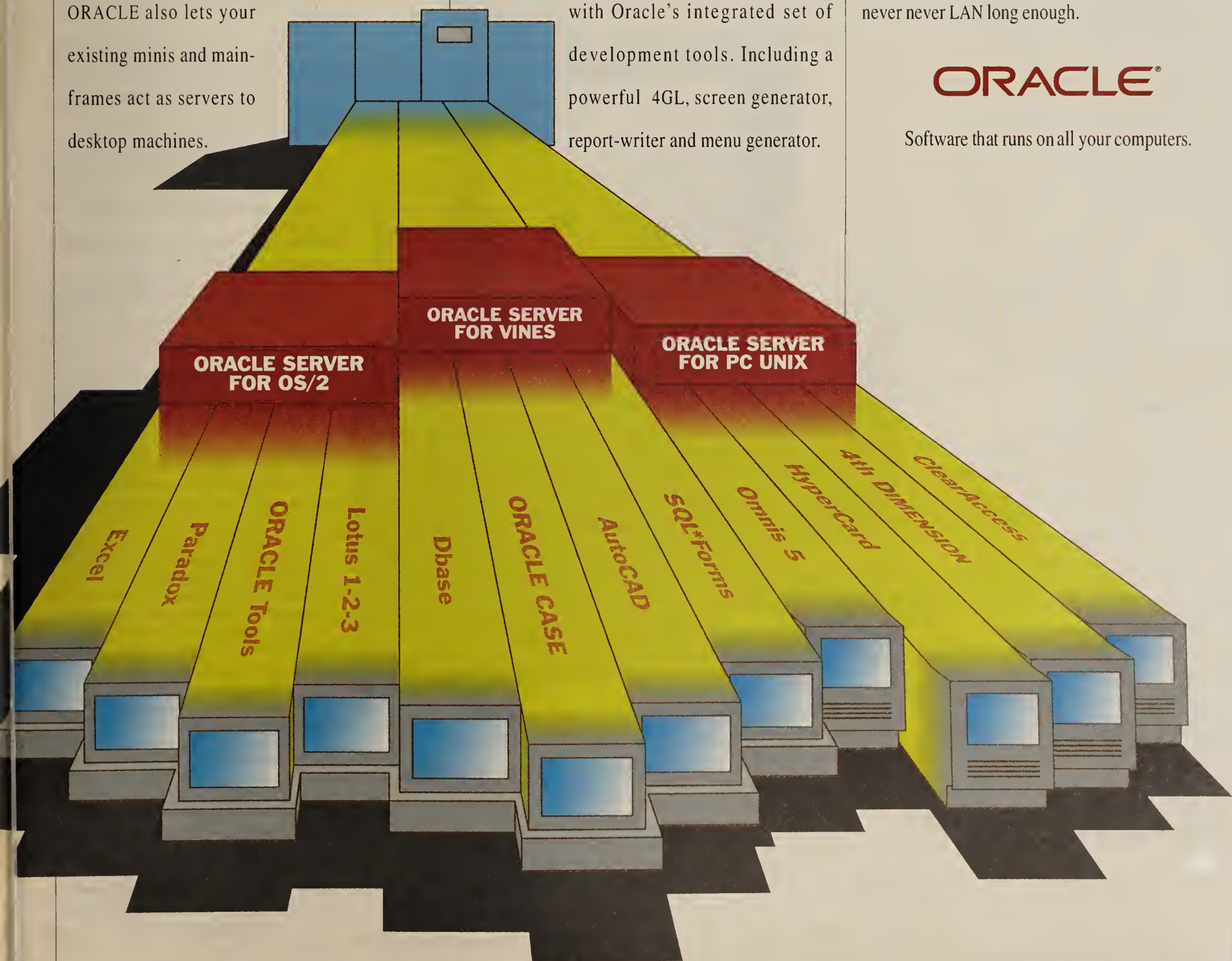
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HDS downloads disk code

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — Hitachi Data Systems Corp. (HDS) is not content to let its disk drives "call home" when they are not feeling well. Now, the HDS engineering staff can send some prescription medicine down the modem line, the company said last week.

HDS claimed that an enhanced version of its Hi-Track maintenance program adds the dimension of on-line repairs to a 5-year-old automatic failure-reporting system. "We can apply many microcode

changes without taking the customer site down," said Jeff German, manager of technical support at HDS.

The new feature, called Dynamic Microcode Download, adds to Hi-Track's existing ability to monitor, detect, diagnose and repair failing storage systems before they crash.

"If you're reacting to the threshold of pain that people at your customer sites have, then you won't prevent failures," German said.

After notifying customers of a device's impending failure, HDS technicians can send the patched software down a dedi-

cated telephone line. Payment for the Hi-Track service is included in the normal maintenance fee; the same automatic call-in service will be extended to the new generation of HDS EX mainframes later this year.

Hi-Track is installed in 3,000 disk drive and tape storage systems worldwide, according to HDS.

The right approach?

However, some industry analysts are unsure whether this kind of service can build HDS' market share relative to IBM and Amdahl Corp. "This feature is not by itself going to convince a customer to buy an HDS 7380 or 7390 disk drive," said Robert Callery, a senior storage analyst at Technology Investment Strategies

Corp. in Framingham, Mass. Not all microcode changes will be simple enough to transmit over the wire, Callery added.

"They aren't the first to deliver a proactive maintenance philosophy, but they are the first to do it in the IBM marketplace," said Paul Wolfstaetter, program director at Gartner Group, Inc.'s Enterprise Storage Strategies Group in Stamford, Conn.

IBM has a service director plan that automatically relays disk drive errors to IBM field service centers worldwide. Once error alerts are received, IBM calls the customer site to schedule maintenance, IBM said. Digital Equipment Corp. and Hewlett-Packard Co. also offer automatic device-error tracking services, spokesmen said.

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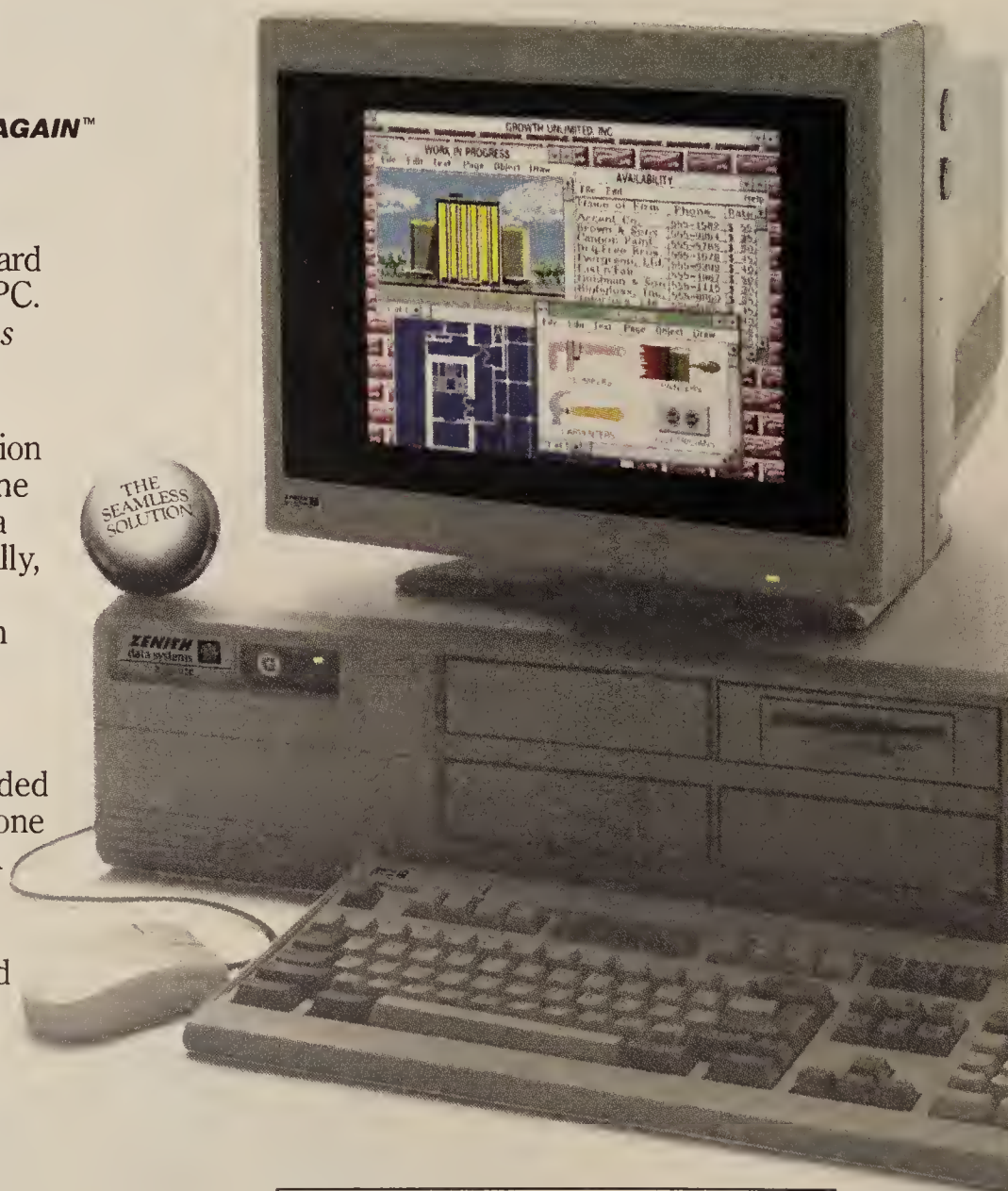
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Groupe Bull

SAS to blanket Unix market

BY SALLY CUSACK
CW STAFF

NEW ORLEANS — SAS Institute, Inc. said last week that the SAS Application System will be available on almost every Unix-based hardware platform by year's end.

Designated Release 6.07, the newest version of the SAS Application System will be released in two phases, SAS President James H. Goodnight told users at the annual SAS User Group International convention held here.

The first phase, scheduled for delivery by the end of first-quarter 1991, will support the following:

- Digital Equipment Corp.'s RISC/Ultrix Release 4.0.
- IBM's AIX on the RISC System/6000 system.
- Hewlett-Packard Co.'s HP-UX on the HP 9000 Series 300 and HP/Apollo Division Unix-based workstations.
- Data General Corp.'s DG-UX on DG Avion workstations.
- Mips Computer Systems, Inc. RISC/OS Release 4.5 on Mips and binary-compatible workstations.

A satisfied customer

Scott Pitts, a programmer at the University of Oklahoma's Health Sciences Center, is a beta-test user for SAS on DG's Unix-based Avion workstation. He said that so far, he is pleased with the software's performance and particularly with its easy-to-use graphics capabilities.

According to Thomas W. Moore III, an analyst at International Data Corp., a Framingham, Mass.-based market research firm, the Unix implementation plan outlined by SAS is ambitious but not unrealistic.

In addition, it was announced that the SAS Application System offers compliance with DEC's Cohesion application development environment and that SAS Institute will deliver an SAS-based executive information system sometime in the third quarter.

A version supporting Microsoft Corp.'s Windows 3.0 is scheduled to be available in the fourth quarter. SAS software currently runs on IBM's MVS, DEC's VMS, MS-DOS and several proprietary minicomputer environments as well.

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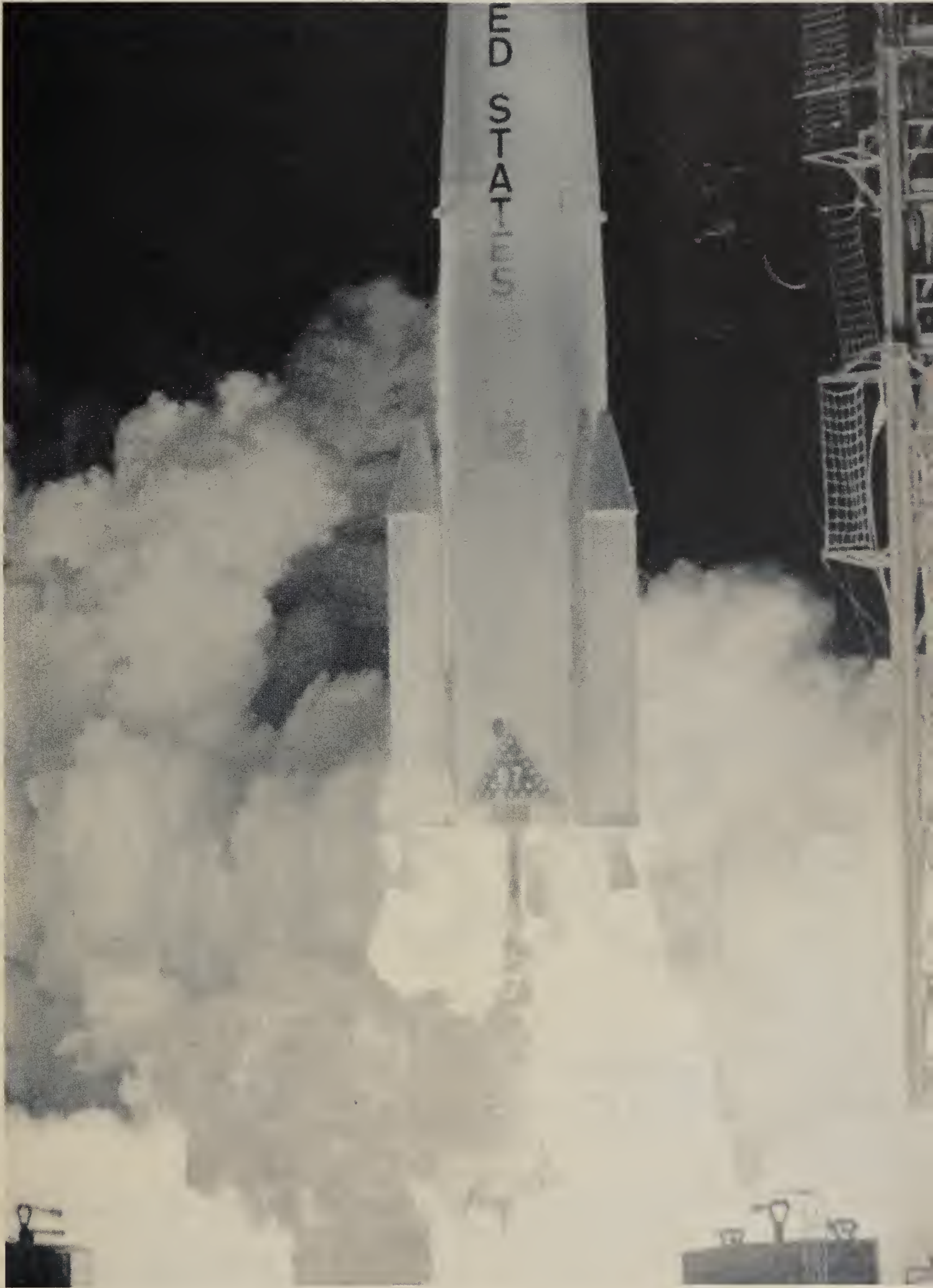
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Legent Netspy monitors host to LAN

BY ELISABETH HORWITT
CW STAFF

PITTSBURGH — Legent Corp. laid the groundwork last week for what it claimed will be the first enterprisewide performance monitoring system that stretches all the way from IBM

VTAM hosts down to local-area network servers.

The company announced Version 4.0 of its Netspy VTAM performance monitoring tool, which is said to alert either IBM's Netview or Systems Center, Inc.'s Net/Master to performance problems. This permits

users to monitor VTAM use and response time on the same terminal that manages Systems Network Architecture networks, Netspy product manager Don Imhoff said.

The new version also supports communications between Netspy systems running on dif-

ferent hosts so a user can monitor different VTAM domains from one terminal, Imhoff said.

General American Life Insurance Co., a beta-test site for Netspy Version 4.0, is interested in the product's ability to forward alerts to Netview, said David Gruzeski, a senior systems programmer. "We will be able to set up parameters, such as when a host response time gets over a

certain value, and have alerts sent to Netview in real time."

Legent also announced plans to bring out a LAN performance monitoring system, Lanspy, by year's end. Jointly developed with Network Intelligence, Inc. in Palo Alto, Calif., the product will feed into Netspy so a user can trace performance bottlenecks, Network Intelligence President Brian Szabo said.

Better LAN tracking

Lanspy will also report when new personal computer users come onto a LAN, allowing the central manager to better track changing LAN configurations, Szabo said.

General American is very interested in Lanspy as a way to monitor performance on its growing installation of token-ring LANs, Gruzeski said. "We are starting to put in 100M bit/sec. rings, so we really need to know what's going on out there."

While companies such as Network General Corp., with its Sniffer product, provide more in-depth protocol analysis, Lanspy will be the first system to offer end-to-end performance monitoring from a central terminal that feeds into Netspy, Net/Master or Netview, Szabo said.

Lanspy will initially support token-ring LANs with Ethernet support planned for the future, Legent said.

Pricing was not available.

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Dell bows out of S. Africa

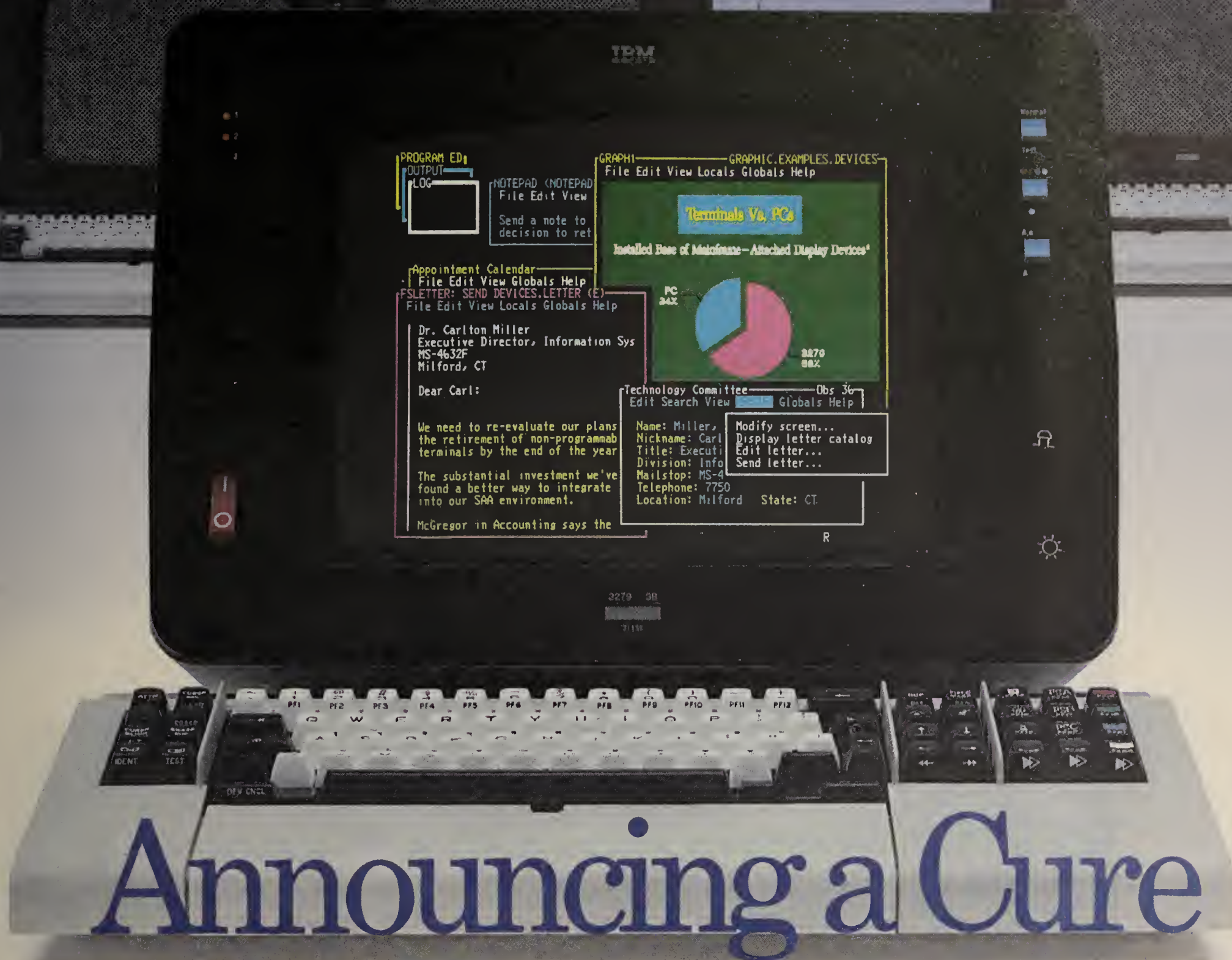
BY J. A. SAVAGE
CW STAFF

Bowing to pressure from three local governments, Dell Computer Corp. has cut ties with its distributor in South Africa.

Dell's vice president and legal counsel, Rick Salwen, said although the company had certified through the U.S. Department of Commerce and the U.S. State Department that Johannesburg-based Incorporated Data Systems was black-owned, certification was not enough to satisfy statutes in the county of Los Angeles, the state of Michigan and the city of Pasadena, Calif. Those entities have rules against doing business with any company that does business in South Africa because it practices apartheid.

The three governments notified Dell last spring that they would not do business with the company and cut off their enterprise with Dell.

"We had no orders from them for three or four months," Salwen said. "Based on that, we terminated the relationship with Incorporated Data Systems in October 1990."



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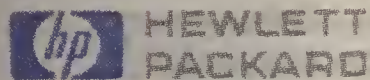
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ADVANCED TECHNOLOGY

TECH TALK

Jumpin' Josephson!

■ Fujitsu Laboratories Ltd., Toyo Sanso Co. and Shinko Electric Industries Co. have developed and tested the world's first cryogenic system for Josephson computers, according to Fujitsu. The new system, which includes Josephson and semiconductor chips, is more than 10 times faster than a system using only semiconductor chips, the company said. Up to now, scientists thought Josephson computers would be impossible to build because high-speed operations would require I/O cables to be longer than 1mm in order to connect logic chips at low temperature and memory chips at high temperature.

DRAM dynamo

■ A new 64M-bit dynamic random-access memory chip with a cell size of only 2 sq microns and an access time of 50 nsec is one of the latest developments at Matsushita Electric Industrial Co. Thanks to a more precise laser lithographic process, the chip will be easier to mass produce than chips using conventional manufacturing methods, the company said. Fujitsu Ltd. and Mitsubishi Electronic Corp. also announced plans to introduce prototype 64M-bit DRAM chips. The 64M-bit DRAM chip, the highest capacity chip developed to date, is capable of storing more than 250 pages of newspaper text.

Pixar's new company

■ Pixar, based in Richmond, Calif., plans to spin off a new company specializing in graphics applications based on the company's Renderman photorealistic rendering software and other technology. The new company, which is unnamed, will market Macrenderman, a rendering program, and Showplace, a program that enables users to create three-dimensional pictures without having to draw wire-frame models. Both products are for the Apple Computer, Inc. Macintosh. Pixar is noted for animated films, including *Tin Toy*, which won an Oscar.

Diebold: Multimedia is growing up

The field is still in its infancy, but it will be a formidable adult, computer expert says

The impact of multimedia on the information technology industry has yet to be appreciated, according to John Diebold, chairman of the board at The Diebold Group, Inc. Computers capable of pulling off multimedia trickery are still in their infancy, but it is already apparent that the technology will become widespread and inexpensive. As a result, Diebold said, what will be more important to companies in the multimedia game is not the hardware but the software. In a recent interview with Computerworld's Senior Editor Michael Alexander, Diebold discussed his views on the future of multimedia:

You say that multimedia will change the economics of the information technology industry. How so?

Multimedia hardware will follow the same pattern as the rest of industry. As multimedia becomes more common, the hardware will become commoditized. You will see a small number of large firms producing commodity products. There will also be small firms with short life spans moving in and out of business.

The character of interplay between small and large companies is uniquely multiplied in multimedia because the software takes on a degree of complexity. The larger firms will need images and the ability to access the talent to create images. You will see more acquisitions as a result. This doesn't mean you can't have a successful commodity hardware business, but you will have a better business with software.

Can small entrepreneurial companies, especially those in creative fields, mesh with larger, perhaps more staid companies and yet remain innovative?

Scientists take a new look at meaning of life

BY MICHAEL ALEXANDER
CW STAFF

Neural networks, expert systems, evolver software that mutates according to Darwinian principles and even computer viruses attempt to mimic living things. However, can such computer programs really be considered "alive?" Some scientists who are exploring the new field of artificial life believe so.

Artificial life aims to replicate life-like behavior on computer screens in hopes of predicting human behavior or uncovering what makes us and other living things tick.

Recently, some scientists have begun to ask if computer viruses — self-

You need to strike a balance between the needs of a small number of highly talented people and an organization's need to turn some things into commercial ventures. In the entertainment industry, there is a history of large organizations interplaying with small organizations to get the talent and other elements they need.



Diebold predicts multimedia will someday be widely used in the fields of medicine, business and education

Would you say American firms are less astute than the Japanese in foreseeing the potential of multimedia and the importance of software over hardware?

American companies tend to be slower and have a greater problem making acquisitions that don't have an immediate payoff but one that is more than five years ahead. In the case of Matsushita and Sony, they are paying high prices for businesses that don't currently have substantial earning potential and then positioning them for

larger benefit in the multimedia field.

The two acquisitions you noted, MCA and CBS Records, are of companies in the entertainment industry. Is that where the money will be in multimedia?

I don't think so. It will be more in the professional fields. The medical uses of multimedia will be very extensive and very large. Multimedia in marketing will be very important and will change that profession a great deal. The educational use will also be important.

Most business people on the user side have yet to begin to think multimedia in typical business systems.

Let's talk about multimedia from the end-user side for a moment. What would you suggest end-user companies should be doing now?

I think today, for example, there ought to be more experimentation by users using compact discs, digital video interactive and other disc technologies. Then they have the opportunity to go through the teething process so that by the time the hardware is there, they are ready. They could be building demonstration projects that may cost much more today but then using them with a price structure that will pay in years ahead.

There has been quite a bit of discussion already about copyright and intellectual property in the use of multimedia. Any thoughts on how this issue will be resolved?

I don't think legal specialists have yet come to grips with the heart of the problem: getting rights to images, the right to edit them and to use them out of their original context. The complexity of getting rights leads to piracy by people who do not want to do it.

replicating computer programs — are a form of artificial life. Simply because computer viruses do not exist as organic molecules may not be sufficient reason to dismiss the classification of viruses as a life-form, according to Eugene Spafford, an associate professor of computer science at Purdue University in West Lafayette, Ind.

However, computer viruses do not evolve in the truest sense of the word. Artificial life proponents want their creations to be able to mutate or adapt and more. Evolver software, for example, generates solutions to a problem and then selects the best based on the survival-of-the-fittest theory.

Thinking Machines Corp. has taken the idea one step further with a number-sorting program that becomes pro-

gressively better at solving problems. Eventually, the programming technique could be used to develop self-generating, ever improving software and neural networks.

Computer scientists at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., were astonished to discover last year that a computer simulation of human brain waves began giving off waves of its own. The discovery may provide insight into new computer architectures.

Interested in taking a look at artificial life-forms firsthand? Sinter Software, a Seattle software publisher, markets a \$45 program called Cellmaster that allows you to set the rules that govern the lives of paramecium-like creatures and jellyfish.

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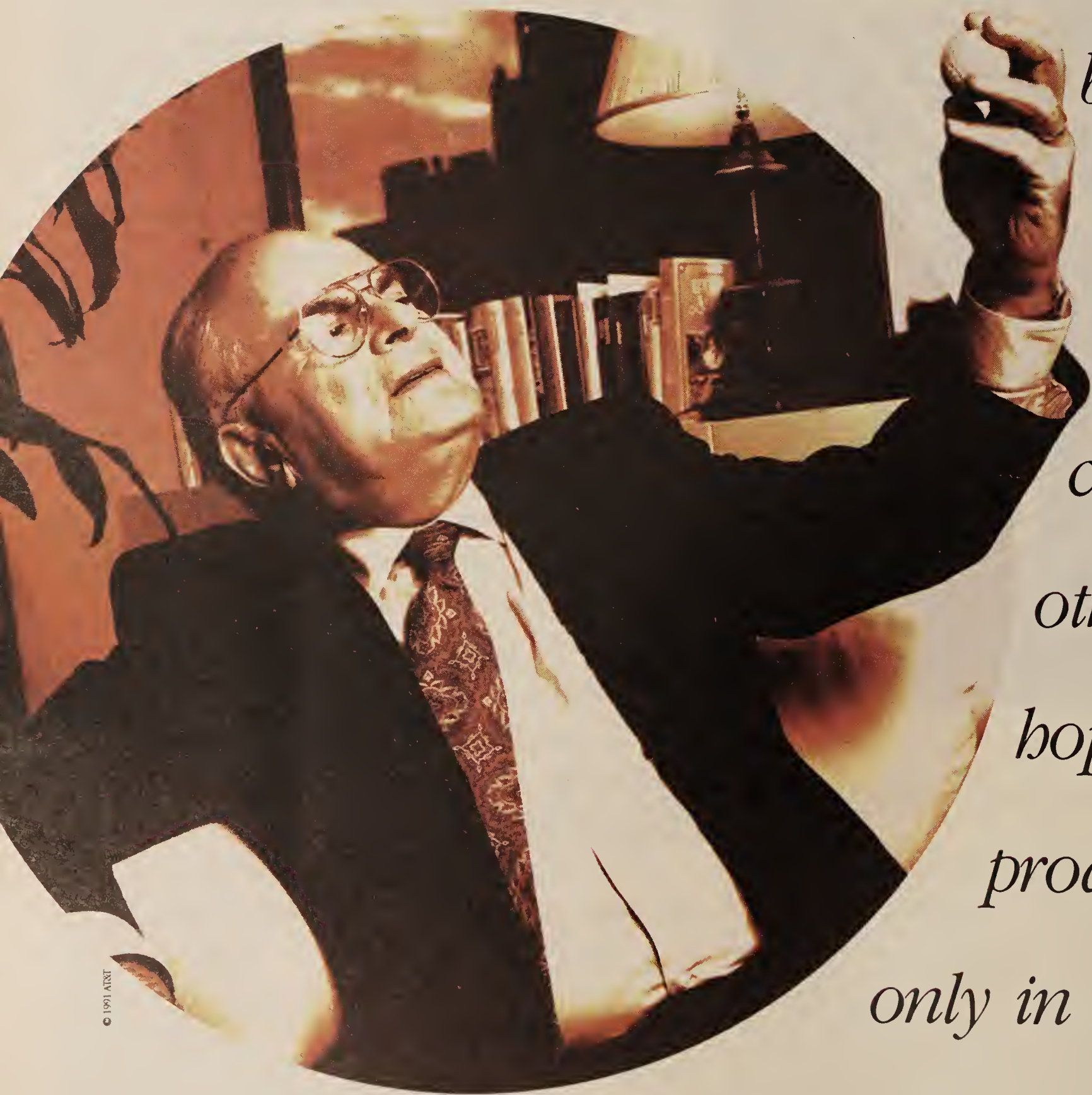
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can control and the things you can't. And as my
tee finds its way to the bottom of a water hazard and
little doubt in my mind which group golf balls fall
that I can easily control an entire phone system*



*but a dimple
I mean, from
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other hand, al
hope that more
products for use
only in the hope that*

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*into two groups: The things you
slice from the sixteenth
though it had a map, there is
into. And it is amazing to me*



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EDITORIAL

Open for whom?

REPORTS THAT A group of leading PC and workstation vendors is forming to promote a standard for reduced instruction set computing (RISC)-based computers raise questions about what role impromptu standards-setting bodies should play. Would this group, which reportedly includes Compaq, DEC, Mips Computer Systems, Microsoft and The Santa Cruz Operation, really make choices easier for buyers? Or would it try to steal thunder from Sun Microsystems as that company works to push its own Scalable Processor Architecture (Sparc) as a de facto industry guideline?

Recent history shows that anything is possible. More than two years ago, a group of heavyweights banded together to form the Open Software Foundation (OSF). The group's stated charter was to standardize Unix, but it was clear that opposition to AT&T and Sun's Unix System V promotion was the bigger issue. Today, the OSF is still struggling to get a product out the door. It has suffered from constant bickering among its members and has recently come under criticism for being too restrictive in licensing its technology to nonmembers. This is open?

Contrast that with the case of the Extended Industry Standard Architecture (EISA) bus specification promoted so aggressively by Compaq for the past three years. True, EISA was an attempt to knock IBM's Micro Channel Architecture (MCA) down a few pegs, but EISA is a qualified success while MCA creaks under the weight of IBM's inability to exploit its purported benefits.

The key difference between these two cases lies in the goal both companies supposedly sought: openness. Compaq promoted EISA as a public domain standard that could be freely licensed by anyone. Independents opted for EISA because it offered incremental improvement over the status quo and carried no risk. To Compaq's credit, it has resisted the temptation to profit from its standards-setting efforts.

In contrast, the OSF has tried to erect a standard that would primarily benefit those who paid to create it. The jury is still out on whether it can succeed, but so far, its performance has been uninspiring.

This begs the question: Is this apparent new effort to establish a RISC standard driven more by altruism or opposition to Sun? Sun's relentless promotion of Sparc as a standard is beginning to bear fruit, in large part because it has pledged to keep the specification open and the risk of cloning it low. If an alternative standard emerges that carries restrictive licensing fees or serves the interests of only a small group of vendors, it will be doomed to failure. The trend is toward open systems, and buyers aren't stupid.

At best, these loose vendor coalitions can bring stability to the market. At worst, they can split it down the middle. Users will let their checkbooks do the talking, sending their dollars to those vendors who they believe share the goal of open computing. To do otherwise would only encourage those who stake their claims in proprietary soil and try to turn back the clock.

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LETTERS TO THE EDITOR

The Next case

Regarding *Computerworld's* reporting on the award-winning Next machine [CW, Feb. 4], Mr. Blickenstorfer's comment that a Next machine "may be rather unfamiliar and exotic for business users" is completely out of line with my own experience.

Perhaps most telling was the following example: A friend of mine who owns a small business recently lamented that his people are screaming for him to computerize. He said he had been investigating various hardware and software but was dissatisfied. We retired to my office, where I cranked up my Next. Simply by asking questions of how he would carry out various tasks, I was able to demonstrate the intuitively simple manner with which Next has developed its computer. It is simple and elegant from the moment you push the power button.

The power of a Next is not only in its hardware architecture but in its simplicity. It is no wonder that Next was the first foreign company to win Japan's prestigious G-Mark award.

Richard P. Casey
American General
Information Services, Inc.
Far Hills, N.J.

Small is beautiful

Although I agree with Charles Wang's title theme that "No software solution is an island" [CW, Jan. 21], I believe his statements claiming that only large companies can provide adequate integrated solutions in the future reflect a self-serving and mainframe-oriented bias.

As Mr. Wang states, "breakthrough" technologies do not al-

ways evolve to have as much impact as was originally envisioned — but some do. In the software industry, it is rarely the large company that provides these innovations; it is the small company with its ear close to the user and an ability to respond rapidly and creatively to what it hears.

Increased standardization creates an environment in which even the smallest developer can build an application that appears and behaves like all other applications on the same platform.

I believe that an integrated "comprehensive solution" provided by a large company will fall far short of the same solution provided by smaller, more focused companies that have specialized in a particular niche of that solution and have built their applications using the excellent standards available today.

Kim O. Jones
President
Forecross Corp.
San Francisco, Calif.

Time...

In regards to Mr. Hitchens' article [CW, Jan. 28], we at SAS Institute several years ago incorporated a solution to the 21st century transition into our software. We have, for many years, used a "SAS date value" for storing dates in user variables. This value is the number of days since a base date of Jan. 1, 1960, and all our date processing algorithms take advantage of this. However, we do allow users to input and output dates using two-digit years, using such forms as "91/01/31." The introduction of our user-alterable option, YEARCUTOFF, allows the user to indicate the first year of a 100-year cycle that will cor-

respond to the two-digit year. For example, YEARCUTOFF=1980 would cause the two-digit years 80 through 99 to be interpreted as 1980 to 1999, while 00 to 79 would be 2000 to 2079. Our default value for YEARCUTOFF is now 1900, but it will probably change as we approach the year 2000.

Richard D. Langston
Core Development
SAS Institute, Inc.
Cary, N.C.

...and time again

Regarding the story "Dating problems now? Wait 'til the year 2000" [CW, Jan. 28], Mr. Hitchens should consider the fact that most systems designers are not idiots. For example, the Pick operating system uses a date format based on the days from a starting point of Jan. 1, 1968. Feb. 1, 1991 would be 8433, and Jan. 1, 2000 will be 11689.

I think you will find that most of the better systems people have taken dates into account for many years. Those who have not will probably not have a system running on Dec. 31, 1999.

David Carlson
Data Processing Consultant
Eastern Casualty
Insurance Co.
Westboro, Mass.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.

Is Microsoft abusing its power?

Smaller vendors find that the software giant casts a long shadow

BOB METCALFE



"Do you think Microsoft is doing anything illegal?" my venture capitalist friend asked as we stood outside the San Francisco hotel ballroom in which Go Corp. had just announced its pen-based operating system for notebook personal computers.

The subject of Microsoft had come up often that day because Microsoft was seen to be preempting Go, as it has done to other small companies in recent years, by projecting vaguely similar future capabilities in its own products. Anticipating Go's announcements, Microsoft had been talking about plans for pen-based extensions to its DOS-based Windows graphical user interface.

With tens of millions of DOS installations giving it an operating system monopoly, Microsoft's product futures formed a chilling cloud over the Go party. The same chill is felt by the whole PC industry, including several companies with which I'm involved. So, despite my love for lawyer jokes, I decided to

take my friend's legal question seriously.

"Well, I'm not a lawyer," I answered, "but let's see, there's the Sherman Act. As I recall, that discourages monopolistic collusion on prices and anticompetitive territory allocations. There's the Clayton Act. I think that proscribes unfair trade practices, such as tying the sale of one product to another. And, oh yeah, there's the Robinson-Patman Act, which I think requires companies to offer like prices to like customers."

My friend was not happy with this amateur legal checklist. "No, Bob," he said, "I was thinking more along the lines of the RICO [Racketeer-Influenced and Corrupt Organization Act], which aims to break up organized crime."

Concerns about Microsoft's dominance of the PC software industry are now common and no joking matter, but still, I had to laugh. I thought about all those intelligent young people now streaming by the hundreds to join Microsoft in Redmond, Wash. Is it the Mann Act that outlaws the transport of minors across state lines for immoral purposes? Had we just created a new joke genre?

I was laughing, but my friend wasn't. He was deadly serious. Joking aside, is Microsoft abusing its monopoly?

The word monopoly reminds me of IBM, especially in the 1960s. As I recall my mother telling me, it was often alleged

back then that IBM abused its mainframe monopoly by making preemptive announcements to thwart competition. A case in point was its announcement of a subsequently aborted mainframe (the 360/191, I think it was) to rain on Control Data's 6600 parade. IBM was sued, eventually submitted to a consent decree and has since limited such preemptive behavior.

Is Microsoft in a similar situation? Do its hints of future pen-based extensions to Windows constitute unfair competition with Go? I think so. When you begin to dominate an industry, you take on new responsibilities and certain new standards of behavior.

Other Microsoft tactics, also reminiscent of alleged IBM misbehavior in the 1960s, surround its vertical integration into application software. We've all heard how Microsoft got the PC software industry ramping up on OS/2 and Presentation Manager and then suddenly switched to Windows. And what about the abrupt introduction of a new extended memory programming interface with the latest version of Windows?

Does this kind of behavior constitute unfair competition against other applications developers who do not have the advantage of early access to Microsoft's operating system plans? I think so. I think that if the DOS world is to remain a level playing field for the development of exciting new applica-

tions, DOS' supplier must divest its applications business.

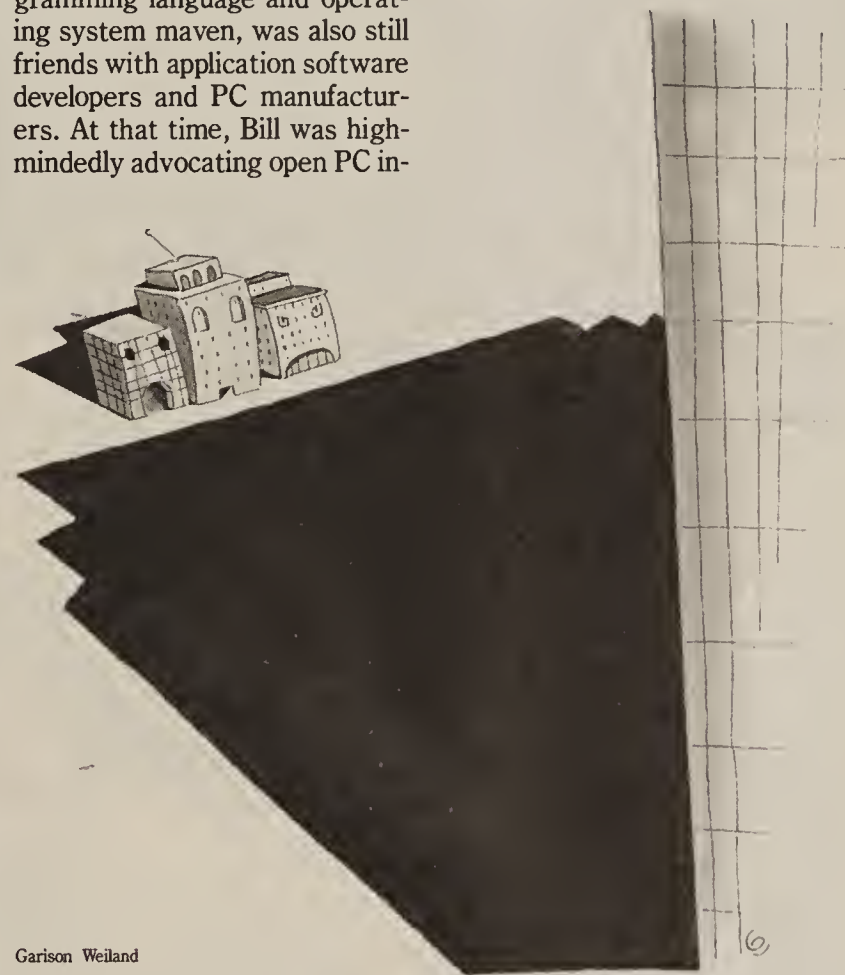
Evidence of abuse of monopoly power may also be found in what many consider Microsoft's extortionate (catch the RICO connection?) software licensing terms. Do you have a choice not to license DOS on Microsoft's terms? Yes, you can opt for Unix or Digital Research's DR-DOS. But considering their market shares, are these real alternatives? I don't think so.

Bill Gates was once my friend. I haven't visited with him since long before Microsoft and my former company, 3Com, entered into their ill-fated partnership on OS/2 LAN Manager. That was way back, when Bill, the programming language and operating system maven, was also still friends with application software developers and PC manufacturers. At that time, Bill was high-mindedly advocating open PC in-

dustry standards as liberation from the coercively proprietary mainframe world.

Now, with Microsoft on top, most of Bill's remaining friends are his shareholders. Bill's speeches, long a source of vision for the open PC industry, have become self-serving outlines of Microsoft's rapacious product plans. Bill's industry partnerships have turned one-sided and sour. And Bill's company, known in the past for drawing new customers to a burgeoning industry, is spending too much of its considerable energy on damaging dependent competitors in a stagnant market.

If Microsoft's abuse of its monopoly isn't illegal, it ought to be.



Garison Weiland

Multimedia: Big boys use standards as a weapon

HARVEY NEWQUIST



Multimedia is the leading contender for the hottest buzzword of 1991. Multimedia is not really a new technology, just a long-overdue synthesis of different technologies that make data more presentable, understandable and appealing to users. Even so, we're already seeing the beginnings of the kind of gruesome verbal battle that usually breaks out among vendors, analysts, the popular press and users during the early stages of every "new" commercial technology.

What's unusual in the case of

multimedia is that the most noise isn't coming from the small start-ups — the tiny companies that make the biggest technological contributions — but rather from a handful of megacorporations, such as IBM, Microsoft, Tandy, Zenith and AT&T, which still haven't quite determined how multimedia fits into their marketing strategies. They know that it ultimately will have to; they just haven't figured out the how, what, when and where of it.

To stall for time, these vendors have introduced (force-fed is probably a better term) a set of standards to the user community, which really muddies the pertinent issues of multimedia.

Led by IBM and Microsoft — neither of which has a dedicated multimedia product offering outside of some splashy promotional ideas — this group of companies wants to impose standards for

development and deployment of multimedia applications ranging from the compression of video images to playback rates. And, as is often the case, those who have bestowed this set of standards upon us don't have anything tangible to put behind it.

Cloudy vision

Unlike pioneering multimedia companies such as Macromind, Farallon or Radius, IBM and Microsoft have offered the market nothing in the way of product; they have only offered *vision*.

Standards are fine when it looks like enough companies are taking disparate paths to develop applications that ultimately will not be compatible with each other. But having the two largest and most influential computer companies in software and hardware arbitrarily set their multimedia standards without allowing the industry's users to sort through the existing product offering smells a little too self-serving, like trying to cut up a pie before it's even been made.

Products such as Lotus' 1-2-3 and Microsoft Word became de-

facto standards because users gravitated toward them. No one told users, "here's your standard. Like it and love it because that's all you're getting."

This same attitude set the artificial intelligence industry back nearly five years, after a quick growth in the mid-1980s. When the AI vendors changed their attitude and listened to what the customers wanted — a novel concept — sales returned, and revenue skyrocketed. Those who didn't listen slipped quietly into Chapter 11.

The first group this IBM/Microsoft standards activity affects is the one comprised of dedicated multimedia companies such as Radius and Macromind. Having responded to customer demands during the last few years, these firms will now have to further modify their product plans to become "standardized" — if they follow IBM and Microsoft.

The second group of victims is the users. Getting stuck with a standard before it has been thoroughly market tested means users will have to accept products that may not meet their require-

ments simply because these products are designed, first and foremost, with IBM and Microsoft in mind. Look at the Personal System/2, OS/2 and Windows 3.0, not to mention Officevision. Each of these products is an example of years of broken promises made to customers about the "potential of the future," while substandard revisions of interim products were fed piecemeal to feature-starved users. Need I say more?

Yes, because the third group affected is IBM, Microsoft and, indirectly, their compatriots in this standards process. Users get tired of nonsense. That's why they killed off the PC Jr. and the original IBM RT, stuck with Extended Industry Standard Architecture-based PCs and avoided Micro Channel Architecture-based machines in droves.

Until both IBM and Microsoft put their products and applications where their mouths are, fancy videotapes and full-page advertisements are not going to make them multimedia powerhouses. In other words, I'm not impressed.

Newquist is chief executive officer of the Relayer Group, which publishes "AI Trends" and the "Multimedia and Text Report."

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COMMENTARY

Johanna Ambrosio

Strange way to win friends

Some Computer Associates customers are switching rather than fighting the company's recent price increases on about one-fifth of its IBM VSE product line. Other observers are simply wondering why CA chose this particular battle at this time.

Just as CA is making real progress toward resolving its longstanding support and service problems, the company is again generating bad will over the VSE move and other pricing issues.

CA is demanding fees between \$1,400 and \$11,500 for users upgrading to VSE/ESA Version 1.1. According to one CA executive, the higher price tags are justified because of the amount of work needed to prepare the new VSE-based releases [CW, Feb. 4].

However, CA appears to be the only independent software vendor to take this tack. Spokesmen from five other vendors — Software Engineering of America, On-Line Software International, Goal Systems International, B.I. Moyle Associates, Inc., and Cincom Systems, said they were not asking customers for any additional costs for the upgrades. Most of those vendors said the amount of work they had to do was minimal, and they felt that it was inappropriate to ask users to ante up more money.

This radical difference in philosophy has not escaped the notice of at least two users, both of whom are pulling out their CA software over the

Continued on page 32

Microvax still making its mark

ANALYSIS

BY MARYFRAN JOHNSON
CW STAFF

With a roster of big customers such as Toys 'R Us, Inc., Blockbuster Entertainment Corp. and a chain of French banks, there is a reasonable temptation to call Digital Equipment Corp.'s entry-level business computer "The Mighty Microvax."

From the circa-1985 Microvax II to today's Microvax

3100E, DEC has sold nearly 200,000 Microvaxes. The bulk of them have been Microvax 3100s used mainly as servers for local-area networks of personal computers.

But now the powerful little VAX 4000 has crashed the party, dropping the "micro" from its name and making obsolete three other Microvaxes that have yet to see their third birthdays.

Where is the Microvax line headed?

"It seems clear there's going to be one Microvax left — the 3100 — and DEC's plan is to move people into the VAX 4000 line," said William Bluestein, an analyst at Forrester Research, Inc. in Cambridge, Mass.

"DEC's strategy is to have a block called Entry Systems, which will be the [Microvax] 3100 and 3300 initially," said Robert Kidd, an analyst at Dataquest, Inc. in San Jose, Calif. "They're blooming the upper end of the line and adding prod-

ucts in between with enough different technology and expandability to make it attractive to different buyers."

What Microvax customers can expect during the coming year is "time to take a breath," said Duncan Anderson, a marketing manager at DEC's Entry Systems Business unit. "We're done for a while. The major developments we have coming will be in the software and peripherals," he added.

Some customers may feel a bit disoriented by how quickly the Microvax 3800 and 3900, introduced in April 1989, were replaced when the VAX 4000 showed up in October 1990.

Within three months of installing its new Microvax 3800, Henry's Tackle and Sport Co. saw its new computer undone by the VAX 4000.

"Of course it worries you," said Mickey Bowen, data processing supervisor at the sporting goods distributor in Morehead City, N.C. "You worry that you put your money in the wrong place, but at that point, you have to live with it."

Better price/performance

As DEC's first system designed for client/server applications — and one powerful enough to chomp into low-end VAX 6000 sales — the VAX 4000 Model 300 offers 60% better price/performance than high-end Microvaxes, as well as twice the memory, storage and I/O throughput.

Yet, while it has the same Q-bus backplane as the Microvax 3000s, the VAX 4000 is really aimed at different users, Anderson said. Compared to the average Microvax 3100 price of \$15,000, the VAX 4000's \$106,000 price tag clearly labels it for a league that requires superior I/O speed, processor power and expandable storage.

"The 3100 is a low-cost, PC-like machine that runs VMS — the kind of machine you string

Continued on page 33

FEATURE: MAINFRAME SPREADSHEETS

Feeling the squeeze a decade later

BY MARY LOU ROBERTS
SPECIAL TO CW

Personal computers and spreadsheets. The two seem to go together like baseball and hot dogs, paper and pencil, Burns and Allen.

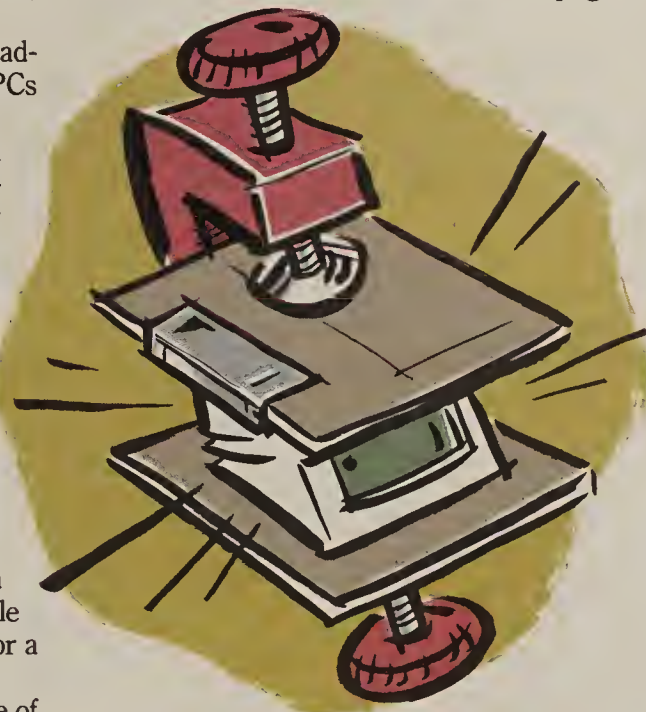
Yet, it is easy to forget that spreadsheets gained their initial acceptance not on PCs but on mainframes. Joseph Difilippantonio, information center specialist at Pfizer, Inc. in Easton, Pa., notes, "When we first implemented our information center in 1982 or '83, the PC was not all that popular. We needed a spreadsheet, so we bought Dynaplan [a product of Dynasoft Corp.] for our mainframe."

A decade later, however, the mainframe spreadsheet market has fallen on hard times. The widespread acceptance of PCs in the corporate world, coupled with increased hardware and software power on the desktop, have caused spreadsheets to be viewed largely as a desktop function: Hardly a company exists that does not own multiple copies of Lotus Development Corp.'s 1-2-3 or a similar spreadsheet.

Is the mainframe spreadsheet on the verge of

extinction? Some think so. Jack McGrath, publisher of "@MAX," a newsletter dedicated to PC spreadsheet computing, suggests "most of the tasks that have to be done anymore can be done on micros or on networks of micros." Bill

Continued on page 33



Timothy Carroll

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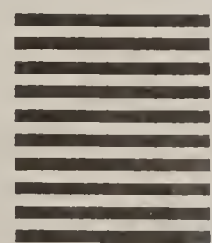
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Per-user pricing may be fair but a headache, too

BY JEAN S. BOZMAN
CW STAFF

When you go to the butcher, you buy meat by the pound. At the gas station, you buy by the gallon. How about software? Right now, most multiuser database software packages are sold by the yard, either by site license or by hardware platform.

However, database management system vendors are considering a move to per-user pricing, and users are left to wonder whether that approach is going to make them pay more.

Per-user pricing will shift the burden of proof to the user precisely at the time when cost-conscious vendors want to raise their monthly revenues. Until now, most sites have paid a flat

fee for DBMS software according to the type of computer hardware used. Accordingly, some DBMS users feel per-user pricing will increase their total costs, and vendors maintain this will be true in many cases. Per-user pricing also creates a new level of complexity in information systems administration, something some users are unhappy about.

"The worst-case scenario is that it would be a headache to administer," said Tom Moore, a senior consultant at International Data Corp. in Framingham, Mass. "It could be difficult to determine how many people are using the system at any one time."

However, users interviewed recently at 10 sites around the country said per-user pricing

may prove more equitable than the current system, which works against small numbers of developers using large machines.

"The Oracle financial applications modules we bought are very expensive and based on the processor size," said Lyria Charles, director of IS at Dunn Edwards Corp., a Los Angeles-based retailer of paint products. "We said we would only have a few people using the system, so it wasn't fair to pay such a big price."

Making plans

Sumitomo Bank Capital Markets, Inc., a New York-based trading company that uses Sybase, Inc. software, is already planning for the expected vendor move. "Per-user pricing just

means that you're paying a fair share based on usage of the software," said Kevin Scully, vice president of systems and technology at the 60-person firm.

So far, most of Sumitomo's software is paid for on a site-license basis. But per-user pricing is in step with the firm's budgeting practices, which already calculate per-user costs for hardware.

Vendors that have tried per-user pricing reported that the system worked well even if there is some uncertainty at user sites about how to pay for software. Informix Software, Inc. has been selling most of its database products on a per-user basis since January 1990.

"Clients usually notify us when the business changes and

they need to put more users on the database system," said Gilbert Wai, vice president of product marketing at Informix. "We do it on the honor system because you can't enforce against software piracy. But we do have built-in [software] monitors to let people know when they've exceeded their bounds."

Sybase, which uses per-user pricing on a limited basis, may soon expand it. Oracle Systems Corp. and Ask Computer Systems, Inc. also said they are considering a wider move to per-user pricing. A taste of what may come has already been seen in local-area network software use.

"If you pay for a 10-user license, and the 11th person logs on, the software may lock that person out," said David Alessandro, manager of technical services at Textron Financial Services, Inc. in Providence, R.I.

Computers help launch space research projects

ON SITE

BY SALLY CUSACK
CW STAFF

SACRAMENTO, Calif. — The U.S. space shuttle program is getting a new type of power boost in the form of the Advanced Solid Rocket Motor, a sophisticated propulsion system from Aerojet that will replace the traditional rocket boosters used to propel objects such as the shuttle and the futuristic space plane through the atmosphere.

As with other projects, there is competition for the research contract, and computers are playing a role in that competition.

Aerojet is a division of GenCorp, Inc., and it is using a Pick Systems Pick-compatible database management system from Prime Computer, Inc. to perform cost analysis for bidding projects such as the \$1 billion Advanced Solid Rocket Motor contract from the National Aeronautics and Space Administration.

The DBMS, Prime Information, was developed for the Prime minicomputer environment and provides Aerojet with cost tracking, budgeting, materials and man-hour expenditures for data analysis.

According to Chris Arndt-Kohlway, computer scientist at Aerojet, the facility has been using the software for almost five years and last November began using it in conjunction with the space project.

The company also has experience in the Oracle Systems Corp. Oracle relational database environment.

Aerojet runs Prime Informa-

tion on a Prime 6550 supermini-computer platform for cost analysis, and the Oracle database resides on Digital Equipment Corp. VAX machines and supports in-house problem tracking and inventory systems. The DEC VAX 6430 and 6330 are used primarily for engineering analysis and computer-aided design and manufacturing applications.

Arndt-Kohlway said he finds that Prime Information provides a better development environment than relational databases currently offer.

Quick fixes

"It really allows us to fix things on the fly," he said, adding that Prime Information records and fields are not restricted by fixed lengths, making quick changes easier.

Aerojet will also be using PI Plus, Prime's version of Prime Information optimized for the Unix environment, for all nonaccounting applications such as internal billing, human resources and inventory functions. The product will also be used for bidding on future contracts.

Noting that cost analysis is not as glamorous as designing the actual space age technology, Arndt-Kohlway said that it is just as critical in many ways.

"Theoretically, one can design anything. But can it be done for a reasonable cost?" he asked. "There is the real issue."

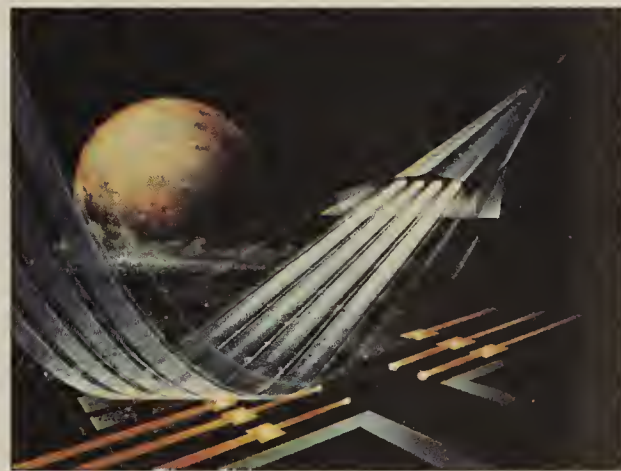
In addition to NASA subcontract projects, Aerojet supplies advanced sensors for sophisticated satellites and plays a major role in the National Aero-Space Plane, which is a runway craft now being designed for space travel.

More than 200 users simultaneously access the Prime Information system on a daily basis, and Arndt-Kohlway said he expects that number to grow to 300 by the end of the year.

All in all, there are 2,000 users connected to the Prime and DEC systems via Ethernet with Transmission Control Protocol/Internet Protocol and DEC's Local Area Transport. Aerojet is currently in the process of converting all its Prime Information-based applications to a Prime EXL 7680 Unix-based platform. The reduced in-

struction set computing (RISC)-based system will use PI Plus.

Describing the EXL 7680 as "super powerful," Arndt-Kohlway said the company bench-



Computers help contractors determine if projects such as the space plane will get off the ground

marked a number of vendors, including AT&T, Hewlett-Packard Co. and various value-added reseller products, before committing to the Prime box.

"The price/performance on the EXL was the best," he said. He added that converting the Prime Information software to the PI Plus format has been extremely easy.

"We've actually taken entire applications over without recompiling," Arndt-Kohlway said. "We just had to do some recataloging. We moved an application in one day and tested it the next."

CASE speeds development for insurer

BY ROSEMARY HAMILTON
CW STAFF

SPRINGFIELD, Mass. — After committing to computer-aided software engineering (CASE) four years ago, Massachusetts Mutual Life Insurance Co. is now reaping some rewards.

Earlier this month, it started to phase in an office administration package, the third major module of a CASE project that will overhaul many of the software programs used by the insurance company. Last year, the firm delivered a medical provider system, which gives on-line access to approved medical examiners and facilities throughout the country, and a client management system, a database system of all insured clients.

An application data entry package is slated for release this year.

All of the systems have come from an internal project called Horizon, which relies on the suite of CASE tools from Texas Instruments, Inc., said Peter Da-

boul, senior vice president of information systems and services.

The company began the CASE project in 1987. It devoted nearly two years to planning, learning the TI methodology, preparing, training and performing initial development before the official software development and installation began.

Although Mass Mutual is now using several software packages from this effort, Daboul said, the company has yet to get the big payback from CASE. He said he expects that it will come later when developers can reuse software from the Horizon project. What is more, maintenance and changes to current applications will require less time because of their CASE foundation.

"There's a near-term payback, but the big hitter will come over time," Daboul said.

Daboul said there are currently 175 staff members involved with CASE. Initially, he was faced with some staff reluctance, which he attributes to the "fear of the unknown." To com-

bat this, Daboul introduced the CASE tools in "vertical slices," or small development projects, in which staff members could work on a program from start to finish. This approach allowed him to phase in the CASE tools and allowed staff members to adjust to them slowly.

He also gave a thumbs up to the TI product and said he has no qualms about tying himself to one vendor's product. This contrasts with IBM's position that a user should select tools from various vendors to achieve a "best of breed" solution.

"If IBM had an integrated tool set, then their marketing pitch would be different," Daboul said. "One of the most difficult issues is the integration of unlike components. I prefer the integrated product approach" that TI promotes.

Nonetheless, he has kept an eye on IBM AD/Cycle developments. "We are watching it," he said, "but we trust TI to do whatever they have to do to remain compatible" with IBM.

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Vice President
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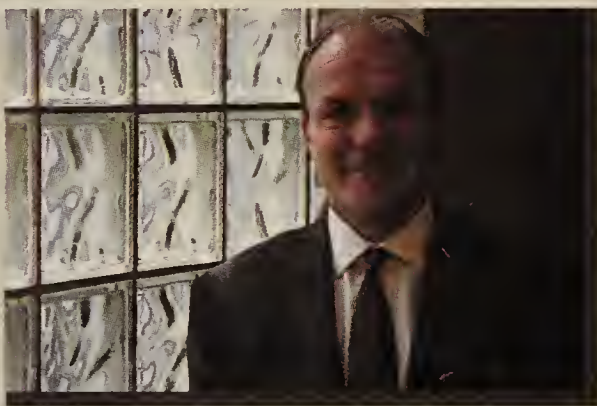
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"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

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Chief Technology Officer
Computer Task Group



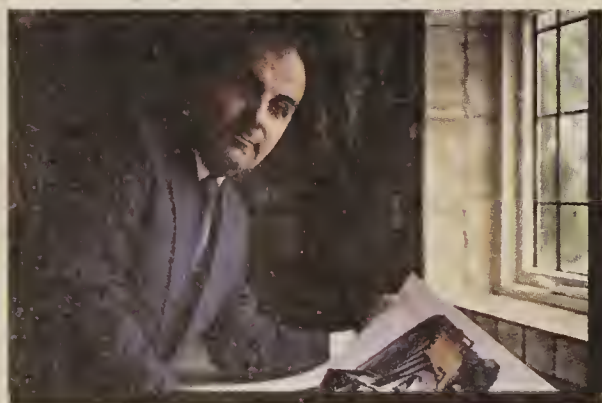
"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

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Wal Budzynski
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"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

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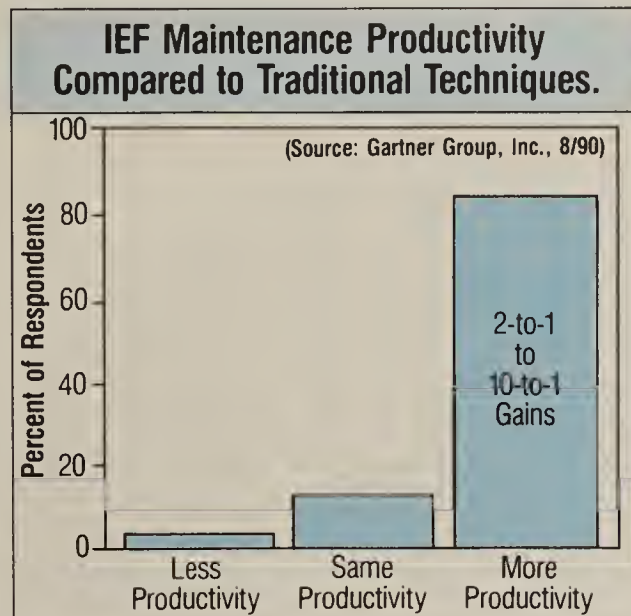
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

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IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's COHESION—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

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Or write Texas Instruments, 6550 Chase Oaks Blvd., Plano, Texas 75023.

TEXAS 
INSTRUMENTS

Ambrosio

CONTINUED FROM PAGE 25

pricing issue.

"This is completely wrong, and I'm not going to pay it," said one user who did not want to be identified because he is in the midst of negotiations with the new vendor. The user added that it will take him no more than about a weekend to replace his copy of CA-Dynam/T with a competing product.

"There are other viable products out there. For what CA is charging to upgrade, you can buy an alternative," said the second user, Alvin Drake, who is manager of technical support at Spartan Food Systems, Inc. in Spartanburg, S.C.

Drake said he plans to replace five of his CA products unless the price increase is rescinded.

So far, CA has stuck to its guns, telling users if they don't pay, they don't get the tapes of the new products. However, Drake said, "I wonder how many customers they'll have to lose before they reconsider that policy."

Especially galling to some users is that they still have not received any formal notification or explanation of the new pricing policy, despite a CA executive's assertion that a letter was sent out to CA customers during the week of Jan. 28.

Although some users are too "married" to their CA products to consider switching, this can't help but further

damage CA's already shaky relationship with the user community.

"Even if customers don't switch, it can't help CA to have customers upset," said Charles Phillips, vice president of Soundview Financial Group in Stamford, Conn. "Because even if they can't leave now, maybe they'll start thinking about doing so eventually."

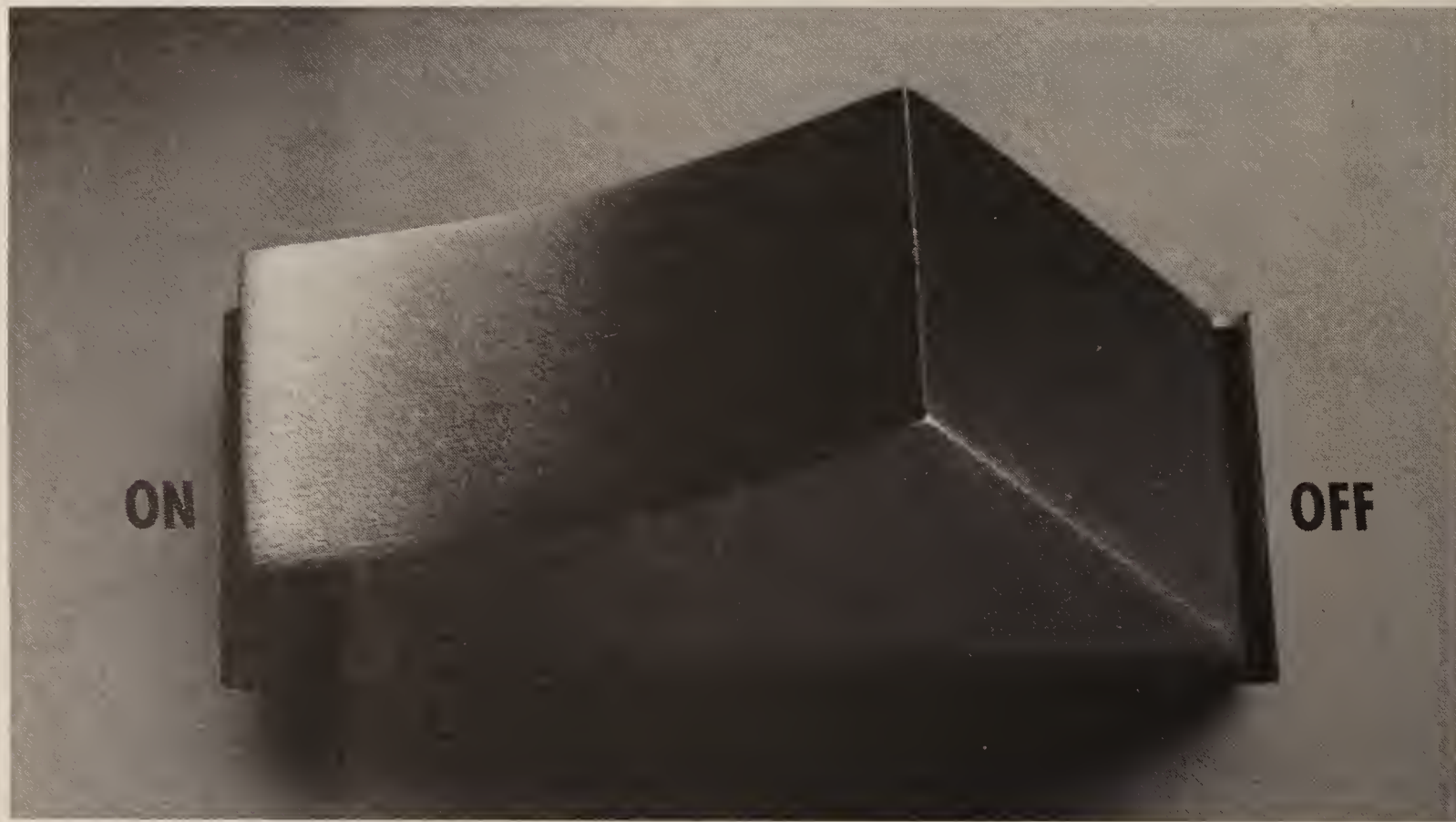
Phillips said that the VSE issue is "just the tip of the iceberg. CA is taking every opportunity to gouge customers with very inconsistent pricing practices." He said he has talked to users that CA has charged up to \$100,000 to "re-do the paperwork" in administrative matters such as two data centers merging. "A lot of customers are ticked off at CA," Phillips said.

So far, there has been no great cry from CA's VSE user base, which, by conservative estimates, includes at least 70% of the 10,000 or so VSE users in the U.S.

Some customers have quietly complained to CA and are waiting to see if any action will be taken, while others have decided to pay because they feel it's their only option.

Still, as more users upgrade to the new version of VSE during the next 18 months, time will tell whether they will, in the time-honored tradition of the computer industry, "vote with their pocket-books."

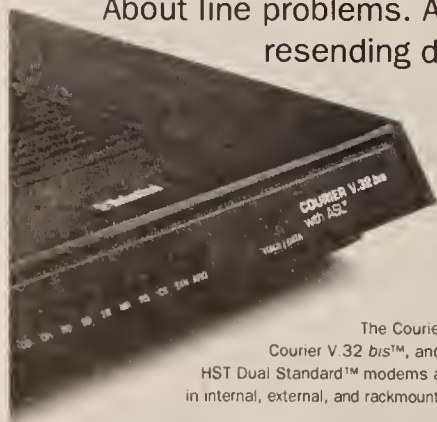
Ambrosio is *Computerworld's* Mid-Atlantic senior correspondent.



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NEW DEALS

Bull wins court pact

Bull HN Information Systems, Inc. was recently awarded a blanket contract from Massachusetts for the Superior Court, Department of the Trial Court. The \$3.4 million contract covers three years and includes two optional one-year extension periods. Under the terms of the agreement, Bull will provide hardware, software, service, support and consultation for the Commonwealth's 20 Superior Court seats.

Quotron Systems, Inc. and **Paine Webber, Inc.** in New York, recently signed a multiyear agreement to upgrade all Paine Webber branches to the Quotron 1000 server and to later migrate some of the securities firm's 275 branch offices to the Unix-based IBM RISC/System 6000 server. The IBM workstations will support brokers by delivering market data and applications to direct-connect or remote terminals. The servers will act as file servers to customer personal computers and workstations.

Phillips Petroleum Co. in Atlanta has signed a \$1 million contract with **Dun & Bradstreet Software** for education and consulting services in support of 14 previously licensed applications. Last year, Phillips signed nearly \$4 million in contracts with D&B for software that was used in the firm's downstream operations, which include refining, supply, transportation, petroleum products and others.

The New York State Office of Mental Retardation and Developmental Disabilities has joined forces with **Digital Equipment Corp.** and **Creative Socio-Medics Corp.** to produce a tracking and billing system for the 70,000 people in long-term care facilities in New York state. The new system, written in the MUMPS language, replaces multiple separate systems and will be one of the largest MUMPS networks in the world.

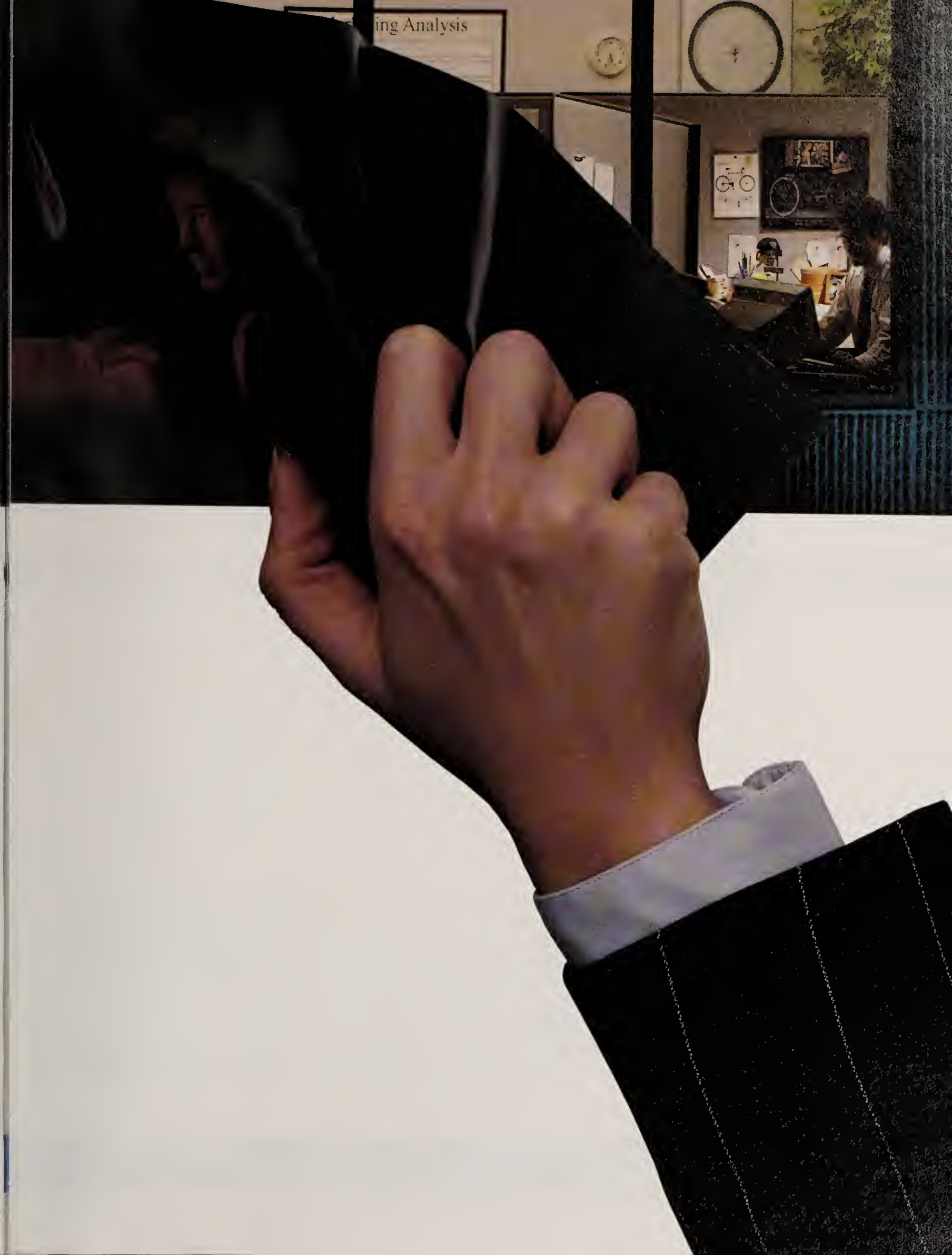
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previously incompatible components into a whole which is truly greater than the sum of its parts. ENTIRE lets you create an enterprise-wide networked computing solution based on NATURAL, our 4th Generation technology that virtually eliminates platform dependencies.

The move marks a major step in the company's transition . . . Analysts and customers applauded the move.
*Computer Systems News**

With ENTIRE, each functional service is provided on the most appropriate hardware platform, which may then be accessed by users from any other platform, all without cumbersome commands or protocols.

Whether your universe contains IBM, DEC, Apple, Hewlett-Packard, Wang, Siemens, or other technology, with ENTIRE you'll soon be working in a seamless environment that lets

you focus on business. And ENTIRE is open to functions that go far beyond traditional data processing to encompass office automation, text management, imaging, geographical information systems and knowledge-based systems with a path to sophisticated multimedia approaches.

Best of all, ENTIRE leaves the details of portability and interoperability where they belong: out of your way. And it leaves your systems completely open so changes in your environment brought on by increased competition or other factors won't catch you unprepared.

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Microvax

CONTINUED FROM PAGE 25

together in a network," Anderson said.

At Toys 'R Us, which is adding 1,300 Microvax 3100s to its network this year, the machines contain the price look-up file that is accessed each time a clerk runs an electronic wand over the price tag. Microvaxes also perform back-office applications such as credit verification and real-time inventory control.

Insteel Industries, Inc. in Mount Airy, N.C., relies on Microvax 3100s and 3800s for production applications and LANs at its 10 mills and manufacturing plants. Six Microvax 3800s support a network with 200 nodes, while a handful of 3100s create LANs at the plants.

"In our current environment, the Microvax is a perfect match to our needs," said John Claxton, Insteel's systems administrator. "The two things I'm happy

est with are the networking, which is close to painless, and the hardware platform itself. We just have not experienced many problems."

Yet Claxton noted that if the VAX

THE MICROVAX is a perfect match to our needs. We just have not experienced many problems."

JOHN CLAXTON
INSTEEL INDUSTRIES

4000s had been available before last October, Insteel would have gone that route rather than choosing Microvax 3800s.

When DEC recently began offering an upgrade path for Microvax users to the

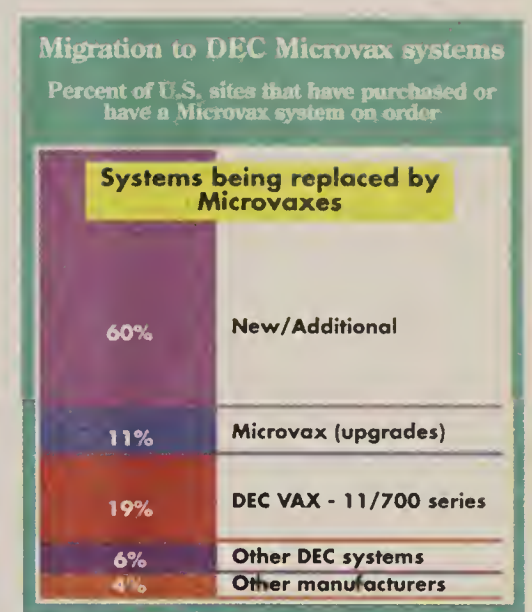
VAX 4000 Model 200 — the \$75,000 low-end of the 4000 line — the company was startled by the avid response. Microvax users are apparently jumping at the chance to double performance, boost I/O throughput and offload the CPU by upgrading to the 4000 Model 200 at \$15,000 for a server upgrade and \$21,000 for a time-sharing machine.

The only real catch is that the Model 200 is not upgradable; a move to the 4000 Model 300 requires a box swap.

At CSX Transportation, Inc. in Jacksonville, Fla., where a duo of high-end Microvaxes are used to develop applications, the VAX 4000 did lure away a recent sale. When a new department required more power than the 3000 series could provide, CSX bought a VAX 4000 Model 300 instead, said Art Masson, director of transportation systems. "We still see a lot of utility for the [Microvaxes], especially in a development environment for smaller type applications," Masson said.

New business

The bulk of DEC's Microvax sales are new or add-on installations



Source: Computer Intelligence CW Chart: Doreen St. John

Spreadsheets

CONTINUED FROM PAGE 25

McNee, program director of software services at Stamford, Conn.-based Gartner Group, Inc., said, "The mainframe spreadsheet market is very weak. For the most part, when people say they want to move beyond the PC, what they are really looking for is a more sophisticated modeling tool."

Software vendors see a stagnating mainframe spreadsheet market. "The market is in drastic decline," says Michael J. May, group marketing manager for data center management products at Goal Systems International, Inc. Goal acquired the Omnicalc product as part of its acquisition of Tower Systems International last year and is still supporting it, but "we don't see it as strategic," May says.

"The mainframe spreadsheet market is not very hot," acknowledges F. Tom Cox, vice president of marketing at Trax Softworks, Inc.

Mainframe to PC

One company that has moved from the mainframe to PCs is Amsco International, a manufacturer of hospital equipment in Erie, Pa. "Until the mid-1980s, we had about 100 users using Dynaplan on the mainframe," says Ron DelPorto, supervisor of network assistance. "For the most part, they worked individually without attempting to share data. But back then, we were used to viewing the mainframe as an end-user computing platform."

Today, the company's 500 spreadsheet users still work independently, but they do it using Computer Associates International, Inc.'s Supercalc5 on a Novell, Inc. PC network.

Pfizer has also seen some of its users move away from the mainframe, according to Difilippantonio. "Dynaplan is very compatible with Lotus' 1-2-3, and we do have about 100 people who prefer to use 1-2-3 on their PCs. We offer our users both, and we don't tell them which way to go. But with new users, we are definitely seeing a trend toward using the PC," Difilippantonio says.

However, in spite of the trend away from mainframe use, some users and vendors say there is still justification for mainframe spreadsheet computing. One frequently heard reason is that most corporate data still resides on main-

frames. "It is easier to access data when the spreadsheet resides in the middle of the corporate data environment," says Ed Spire, president of Dynasoft Corp. Another reason is that a company might purchase a single mainframe copy of a spreadsheet as an economy of scale in-

place so that data can be moved around easily." He does note one drawback: "The one thing most users don't like is the way in which they enter data. They see the data entry process as much easier and faster on the PC."

John Halligan, manager of information

sheet and others are responsible for maintaining it. By keeping it on the mainframe, everybody can access it from his or her own terminal."

Also, Ansonia Copper and Brass has not bought a lot of PCs, Halligan says.

Still, that doesn't necessarily translate

1-2-3 for mainframes

Amid the flood of mainframe market pessimism, why did Lotus, which has set the de facto industry standard for PC spreadsheets, decide to deliver a mainframe version of 1-2-3? Is this, in the words of Gartner Group's Bill McNee, "a waste of resources that doesn't make any sense"?

1-2-3/M, which was unveiled last year, has been called a "clone" of the company's PC spreadsheet product, although Lotus takes exception to that description. "The world has a lot more in it than just PCs. We have always had the goal of making the product cross-platform compatible," says Mike Mitsock, senior product marketing manager at Lotus.

However, Mitsock acknowledges, "the vast majority of the code is the same across the platforms on which Lotus runs," suggesting that Lotus and IBM — which have exclusive sales and marketing rights to the product — have positioned 1-2-3/M not as a stand-alone mainframe product but rather as an extension of the PC version that is unlikely to affect other mainframe spreadsheets. This increases the likelihood that purchasers of 1-2-3/M will be existing Lotus PC customers who were unlikely prospects to purchase any other mainframe spreadsheet products.

MARYLOU ROBERTS

stead of purchasing hundreds of PC copies.

Cox divides users of mainframe spreadsheets into three profiles: First, he says, there are large companies with users who want large spreadsheets or who have on-line or real-time access to a database in which the data changes so rapidly that it is impractical to download it. Second, there are those companies that have few PCs. Finally, there are companies with mainframes already that simply cannot afford to purchase PCs or enough copies of a PC spreadsheet product.

Staying with the mainframe

There are users — generally those who have had mainframe spreadsheets for some time — who buck the current trends and continue to prefer the mainframe.

"I don't see the PC as necessarily better," Difilippantonio says. "For large spreadsheets, the mainframe gives you faster processing speeds and more storage capability. And we have a network in

systems at Ansonia Copper and Brass in Ansonia, Conn., an Omnicalc user, also declares himself in favor of the mainframe: "In our company, some people are responsible for generating the spread-

THE MAINFRAME spreadsheet market is very weak. When people say they want to move beyond the PC, what they are really looking for is a more sophisticated modeling tool."

BILL MCNEE
GARTNER GROUP

to a healthy market. "The trend line is turning down because most of the people who want a corporate mainframe spreadsheet have already bought one. Our product is active, and we will continue to support it, but the market isn't growing," Spire says.

While uses remain for mainframe spreadsheets, the computing community — even vendors — accepts the reality of their dwindling importance. "We understood from the beginning that this was a niche sort of thing," Cox says.

Roberts is a free-lance writer and consultant in Glenside, Pa.

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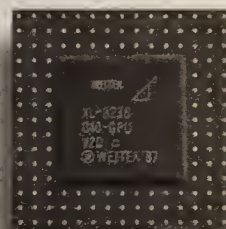
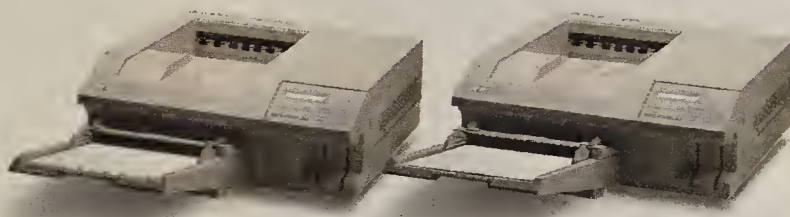
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Applications packages

Jobscope Corp. has announced a software package designed to assist manufacturing companies in authorizing and tracking materials that have been forwarded to outside processors and items returned by customers for repair, replacement or credit.

The External Materials Tracking Module enables users to define multiple shipping destinations for the same material. It also automatically creates shipping records that a billing function can use to create invoices.

The product runs on IBM Application System/400s or Hewlett-Packard Co. HP3000 machines. Pricing begins at \$5,000.

Jobscope
P.O. Box 6767
Greenville, S.C. 29606
(803) 233-1853

Digital Equipment Corp. has announced a job scheduling application designed to automate scheduling and execution of routine system management and repetitive production tasks.

Decscheduler for VMS Version 1.1 features a Decwindows interface, which

displays job dependency relationships for real-time job control and monitoring; a Decforms menu-driven interface, which provides users with job-status information; and a customizable fiscal calendar.

Pricing ranges from \$970 to \$62,500, depending on type of Vaxcluster CPU.

DEC
111 Lock Drive
Marlboro, Mass. 01752
(508) 480-5175

Clarity Software, Inc. has announced Rapport, a suite of object-oriented applications designed to run under the Open Software Foundation's Motif or Unix Systems Laboratories' Open Look graphical user interfaces on Unix workstations.

The product enables users of personal

computers, Unix systems or Apple Computer, Inc. Macintosh systems who are not working in a Rapport environment to exchange mixed-media formatted documents with Rapport users.

Rapport is scheduled for a first-quarter release. Pricing is \$895 per user.

Clarity Software
2700 Garcia Ave.
Mountain View, Calif. 94043
(415) 691-0320

Utilities

BGS Systems, Inc. has announced Release 2 of Best/1-VAX, a set of software tools designed for performance analysis and capacity planning of VAX/VMS systems and Vaxclusters.

The products include Capture/VMS Release 2, which enables managers to view daily reports of systemwide and key work-load performance of a particular VAX system, and Best/1-VMS, which features performance modeling that allows users to predict the effects of work-load growth and system changes on response times.

Pricing for typical installations of Best/1-VAX ranges from \$20,000 to \$40,000.

BGS Systems
128 Technology Center
Waltham, Mass. 02254
(617) 891-0000

NEW PRODUCTS — HARDWARE

Data storage

Mountain Network Solutions, Inc. has announced a ¼-in. small computer systems interface (SCSI) tape subsystem designed for midrange to high-end workstations and network environments.

The Filesafe 7500 (\$3,495) can reportedly store up to 525M bytes of data. It enables users to back up or restore a complete 525M-byte cartridge in less than 45 minutes, the vendor said.

The drive is bundled with Mountain Network Solutions' Filesafe Version 5.1 SCSI tape backup software. A dual-drive configuration, the Filesafe 7500d (\$5,495), features more than 1G byte of storage capacity for unattended backups.

Mountain Network Solutions
240 E. Hacienda Ave.
Campbell, Calif. 95008
(408) 379-4300

I/O devices

Interface Systems, Inc.'s ISI 7224 series of IBM mainframe- and midrange-compatible dot matrix printers now features an optional, dual-hopper automatic cut-sheet feeder and output stacker.

Each hopper yields an output of 130 sheets, and escape sequences may be inserted into mainframe or midrange applications to direct outputs to the first or second hopper. The printers operate at a rate of 400 char./sec. and feature 144 by 144 dot/in. graphics resolution.

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PCs & WORKSTATIONS

Multiprocessor wait continues

ANALYSIS

BY RICHARD PASTORE
CW STAFF

Now that IBM will apparently join the notebook personal computer fray sometime in late March, there remains just one PC niche in which the firm is unaccounted for: the symmetric multiprocessor superserver. While observers said such a system is necessary and inevitable, IBM is following a strategy of upgradable uniprocessor and loosely coupled multiprocessor technology.

Users said they see an obvious gap in IBM's high-end product line. "You've got the 486, and then you go to RISC," Medical Cost Control, Inc. President Joesph Duane said, referring to

IBM's Intel Corp. I486-based Personal System/2 and the very different technology of reduced instruction set computing (RISC) platforms.

Users who are interested in multiprocessing claimed that IBM representatives have been stringing them along. "They say they are working on it and expect to have news for us sometime midyear," said Stephen Anderson, information systems architect at the state of Washington's Department of Social and Health Services.

However, IBM's teasers were not enough to make some users delay purchase. "I wasn't going to base my ability to up-

grade on IBM's word as to whether they're going to do [multiprocessing] or not," said Gerard Nussbaum, director of MIS at Premier Hospitals Alli-

I WASN'T GOING to base my ability to upgrade on IBM's word as to whether they're going to do [multiprocessing] or not."

GERARD NUSSBAUM
PREMIER HOSPITALS ALLIANCE

ance, Inc. in Westchester, Ill. The firm bought a Systempro from Compaq Computer Corp.

IBM said it is not currently interested in tightly coupled, sym-

metric multiprocessing in which the CPUs share memory and require specialized operating software. "There is relatively little software today that can exploit that configuration and fewer multiuser applications," said Robert Carberry, assistant general manager of systems technology at IBM's Personal Systems Division.

Carberry said multiprocessor-capable operating systems such as Portable OS/2 and the Open Software Foundation's OSF 2 — which are 12 to 24 months away — must be delivered before such technology would be practical to implement.

Meanwhile, IBM hopes to satisfy users' power-enhancement needs by designing upgradable uniprocessor systems such as the PS/2 Models 90 and 95.

There were two design choices, Carberry explained. A user could add a second proces-

Continued on page 47

Kit for OS/2 released

BY JAMES DALY
CW STAFF

REDMOND, Wash. — Microsoft Corp. claims it has untangled some of the problems of Windows developers wishing to target OS/2 without rewriting their applications with its recent release of the Windows Libraries for OS/2 Development Kit.

With the new kit, developers can write to a single set of application programming interfaces and simultaneously create both Windows and OS/2-based applications. "OS/2-specific features [can then be added] to the converted OS/2 applications if they have the time and desire," Senior Vice President of Systems Software Steve Ballmer said.

The package — an extension for the Windows Software Development Kit — includes the tools necessary to convert a Windows 3.0 or later application to run on OS/2. The converted applications interact with native OS/2 applications as well as other converted applications as if they were all native OS/2 Presentation Manager applications, Microsoft officials said.

One beta-test user said the \$150 Windows Libraries for OS/2 Development Kit provides a capable way of killing two development birds with one stone. "Not only have we found the conversion process painless, but we're pleased with the performance of the converted applications," said Daniel Browning, president of Precision Software, Inc. in Irving, Texas.

Wordperfect pacifying users with interim Office

BY PATRICIA KEEFE
CW STAFF

OREM, Utah — In response to customer enhancement requests and reported problems with Wordperfect Office Version 3.0, Wordperfect Corp. has released an interim version, Office 3.01.

Also announced was Wordperfect Connections MCI Mail Gateway for Wordperfect office users, which retails for \$495.

In addition, the word processing company updated some prod-

uct plans. Office for Apple Computer, Inc.'s Macintosh and Unix are slated to ship in the second quarter, and work has begun on a Windows version. A gateway supporting Retix Corp.'s X.400 software is expected to ship in the second quarter as well.

The improvements in Office 3.01 include marking within mail in/out boxes, enhanced mail/scheduled notification, X.400 addressing changes and Banyan Systems, Inc. Virtual Networking Software (Vines) Streettalk

System Administration.

Users can now mark messages in either the in or out mailboxes to copy, print, save or delete. Notification has been enhanced to improve speed, interaction with calendar alarms and different network types. Multiple users can now access the same machine and receive individual notification.

Critical support

A key change, according to the vendor, is support in the User Information Files for X.400 addressing and cross-platform compatibility.

These changes allow user lists to be sent across various platforms that support Wordperfect Office and will reflect the

X.400 specification. Office 3.01 also now provides a utility to extract information from the Vines Streettalk directory service and automatically put it into the Office user administration file.

There will be no free upgrade period. The interim update can only be purchased from Wordperfect. The cost is \$10 for Office PC and \$20 for Office LAN.

The MCI Mail Gateway provides access to the following services: worldwide electronic mail, facsimile, telex, IBM's Professional Office Systems, X.400, postal services, Compuserve and Wang Laboratories, Inc. services. The MCI Mail messaging system can extend Wordperfect Office LAN configurations across a wide-area network.

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These are just a few of the 50+ technical sessions scheduled for this year's Conference. But the Micro Focus Users Conference is more than three days of seminars; it's a unique opportunity for developers to meet the Micro Focus technical and support staffs and share solutions with other users through the Conference's Special Interest Groups.

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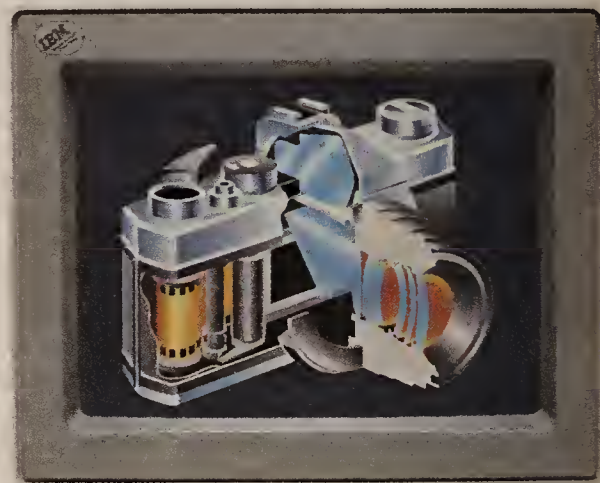
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Right out of the starting gate, the Models 90 and 95 will astound you with their power and sophistication. Featuring a 33 MHz processor and a 25 MHz processor that's easily upgraded to 33 MHz, they deliver blazing speed and balanced performance, expanding your capacity for computer-intensive applications like CAD/CAM, financial modeling and multimedia. The course between your data and your processing has also been strengthened—the Micro Channel™ 32-bit data path, combined with a lightning-quick data-transfer rate, not only optimizes the present power of the 486 processor by feeding it a steady stream of information, but also provides for processor

enhancements and will allow you to benefit from advanced operating systems to come. Plus these other innovations: a wider 64-bit data path which optimizes the 486 processor's access to system memory; 4MB memory standard

(expandable to 32MB); and a 256KB cache option for even greater speed. All in all, it's easy to see how the concept of computer "power" has been enhanced, and how IBM helps you take full advantage of every second of computing time.



BRILLIANCE ON DISPLAY.

With increased power comes increased capabilities—the most visually stunning of which is Extended Graphics Array (XGA), standard on the PS/2 Models 90 and 95, and the heart of IBM's spectacular new display presentation.

With high resolution (1,024 x 768 pels) and execution that's significantly faster than VGA, XGA's sharper, clearer picture, coupled with the IBM 8515 color display, gives you swifter performance in windowed environments, and provides graphics-intensive applications such as desktop

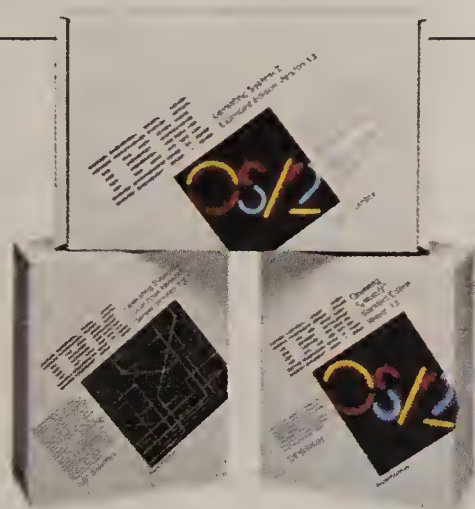


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FAST TIMES ARE IN STORE.

To satisfy even the most demanding storage needs, from LAN systems to data base management to numeric-intensive applications like financial analysis and modeling, IBM has one of the most advanced solutions available. IBM's super-fast SCSI hard disks are pure state-of-the-art performers. With additional hardfile expansion bays, the

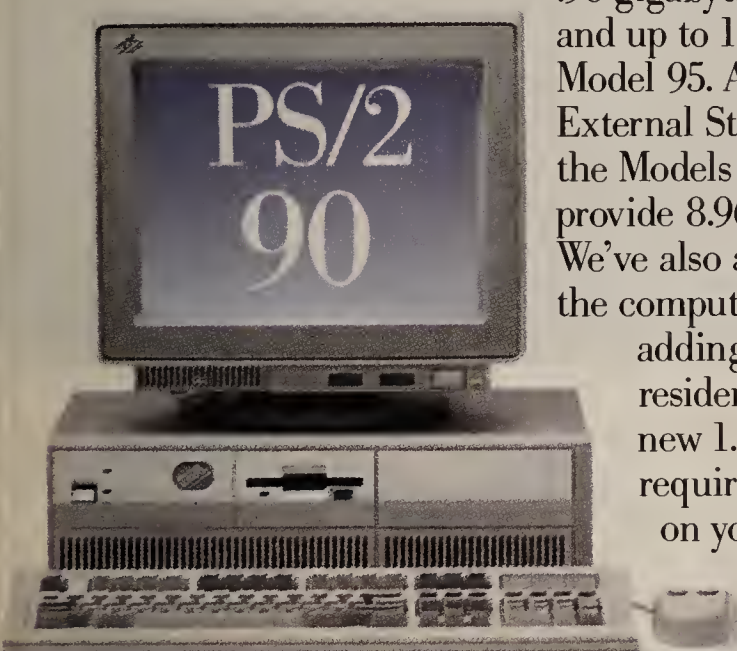


PS/2 Models 90 and 95 have enormous storage potential—up to .96 gigabytes on the Model 90 and up to 1.6GB on the Model 95. And with the PS/2 External Storage Enclosures, the Models 90 and 95 can provide 8.96GB and more. We've also augmented the computing power by adding more flexibility to resident memory—our new 1.3 version of OS/2® requires as little as 2MB on your system. With this streamlined

| Features | IBM PS/2 Model 90 | IBM PS/2 Model 95 |
|---------------------------|--|-------------------|
| Microprocessor | | |
| Standard | 80486 | 80486 |
| Clock speed | 25-33 MHz | 25-33 MHz |
| Optional upgrade | 33 MHz | 33 MHz |
| Memory | | |
| Standard | 4MB (70ns) | 4MB (70ns) |
| Maximum | 32MB | 32MB |
| Integrated Functions | Extended Graphics Array (XGA) and display port, DMA serial port (dual ports on Model 90), DMA parallel port, pointing device port, keyboard port, diskette controller support for three drives, SCSI Adapter with Cache. | |
| Fixed Disk Storage | | |
| Standard | 80-320MB | 160MB-320MB |
| Display Modes | XGA (includes all VGA modes) 640 x 480 x 256 colors/ 64 gray shades; 1024 x 768 x 16 colors/gray shades; hardware support for 132 column text mode; 16-bit direct color mode at 640 x 480 x 64K colors | |
| APA Modes | | |
| Available Expansion Slots | three 32-bit | six 32-bit |
| Bus Architecture | | |
| Data path | MCA 32-bit | MCA 32-bit |

of your system. With Micro Channel busmaster adapters, you can incorporate multiple processors—like adding “computers” to your computer. And coupled with the industry-standard Small Computer System Interface (SCSI), you'll be able to support new applications and continue to build on your system as your needs become more varied and complex.

With optimized performance in balance, power, speed and adaptability, the new PS/2 Models 90 and 95 are designed to keep you ahead of the pack. To find out more about the new leader in 486 computing, contact your IBM Authorized Remarketer or IBM marketing representative. For a remarketer near you, call 1 800 272-3438.



version you not only get more room for applications, but some users will experience a substantial performance increase in system functions as well. So when you need to make great strides with your computing power, you can count on IBM to give you terrific storage capability wherever you may need it.

DESIGNED TO KEEP YOU OUT IN FRONT.

For the turns and hurdles ahead, you'll need technology that has foresight built in. Through a unique design, the Expandable Processor (XP) allows for an architected family of upgradable processor enhancements that can extend the life



How're you
going to do it?
PS/2 it!



PC Magazine just confirmed what Microsoft and DataEase already know.

The qualities which led *PC Magazine* to name DataEase SQL *Best of 1990* also prompted Microsoft to name us a key SQL Business Partner.

No wonder—combining DataEase SQL with Microsoft's SQL Server, creates a virtually limitless client-server computing environment.

DATAEASE: A PROVEN WINNER.

DataEase 4.2, which our SQL front-end product is based on, has long been the corporate solution for "industrial strength" database applications development.

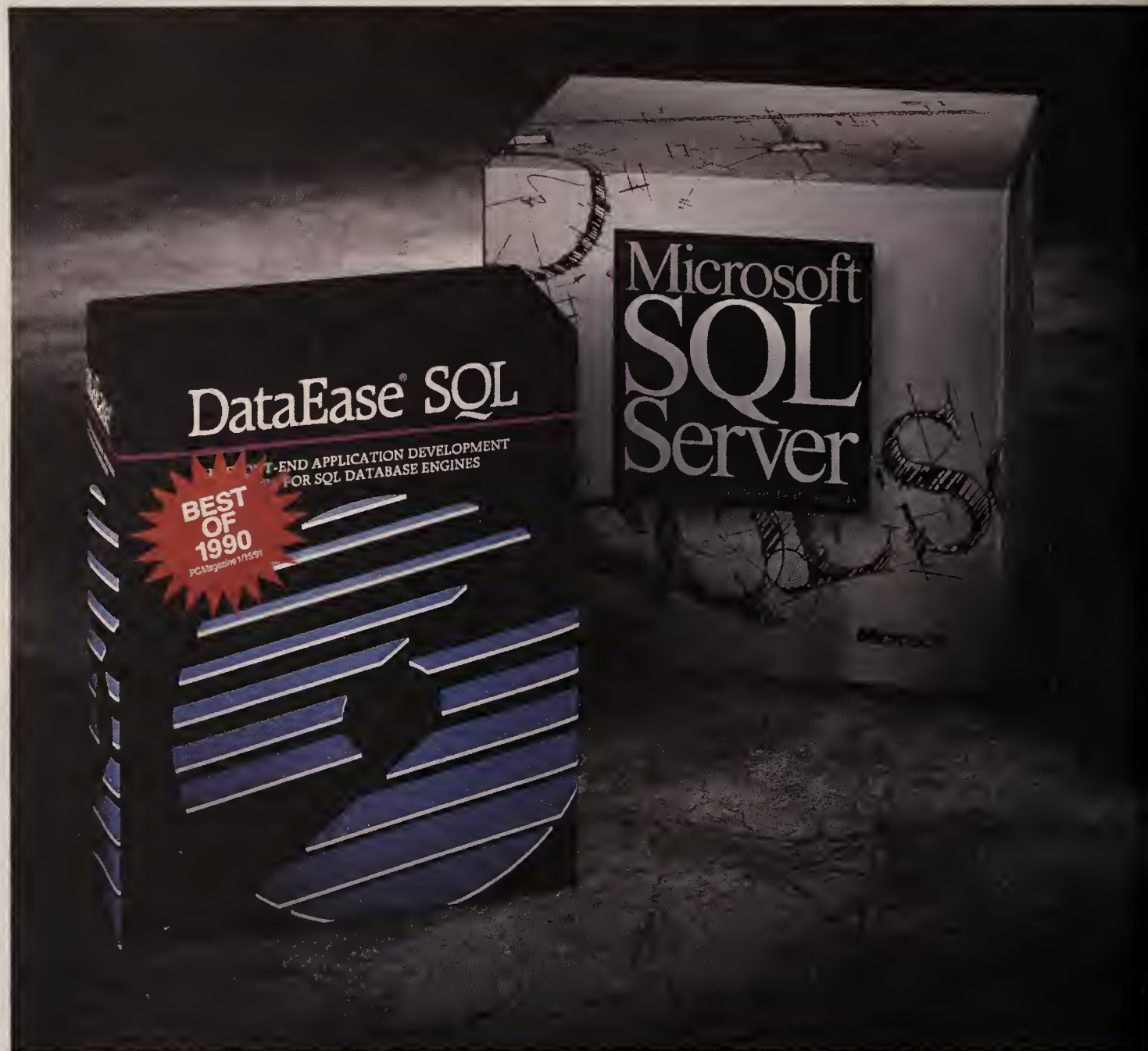
Not only did it place first at the *PC Week* Database Shoot-Out, but we converted the standalone application into a fully-functional client-server system in only 19 minutes. It also won *PC Magazine* Editor's Choice in '86, '88, '89, and *Best of 1988*.

TWO STAR PERFORMERS ON ONE TEAM.

Now that many corporations are making a strategic investment in client-server computing, it only makes sense to invest in the winning team: DataEase and Microsoft.

Only Microsoft SQL Server makes optimum use of client-server architecture with something called Server Intelligence. It lets you centrally manage critical corporate data for your entire PC network with ease.

And only DataEase SQL takes full advantage of Microsoft's technology by giving you transparent



access to all its server capabilities, like triggers and stored procedures, distributed updates, and multi-threaded server access. Plus, DataEase SQL supports both DOS and OS/2 workstations.

When you team the award-winning features of DataEase with the performance, security and integrity of Microsoft SQL Server, you have *one* powerful business computing solution.

AN OFFER YOU CAN'T REFUSE.

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\$995 (regularly, \$1990). Or DataEase SQL alone is only \$595 (regularly, \$995)*.

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It's time you know more about us.

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A Microsoft SQL Business Partner

Ancient Torah art gets new look via computer

ON SITE

BY MEL MANDELL
SPECIAL TO CW

Computers are supplementing a craft — Hebrew calligraphy — that goes back millennia. A computerized service is automatically proofreading Torah scrolls to ensure that there is not a single error among the 304,805 characters.

For more than 2,500 years, centuries before the famous Dead Sea Scrolls were written, scribes have been hand lettering the first five books of the Old Testament. To this day, they still use quill pens on parchment made from the skin of sheep. At least four times per week, congregants read from the scrolls. A Torah must be "perfect" to be used in prayer services. If an error is detected, the scroll is immediately set aside and not used again until it is corrected.

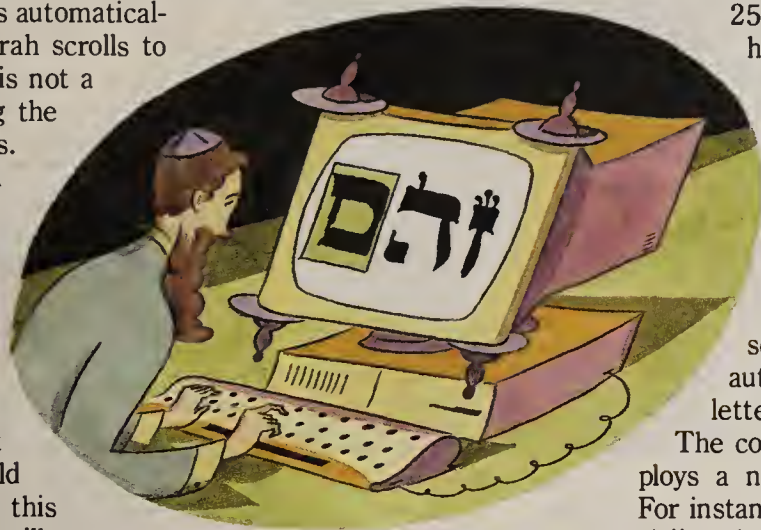
Unfortunately, despite years of training, today's scribes sometimes fall short of the performance of earlier calligraphers. According to Rabbi David Greenfeld, who conceived the computerized service Vaad Mishmereth Stam 15 years ago, more than 90% of new Torahs contain errors. In contrast, few of the older Torahs contain mistakes.

Categories of errors

The unacceptable errors fall into five categories: wrong letters, missing letters, extra letters, missing words and, rarest of all, extra words. After a scribe completes a Torah, which can take 12 to 18 months, three proofreaders or teams proofread the new scroll, according to custom. Nevertheless, errors still escape

them, Greenfeld said.

"One reason for the failure to detect all errors is that today's proofreaders are paid a standard fee [ranging from \$500 to \$1,000 per Torah], whereas old-time proofreaders were paid per error detected," Greenfeld said.



Michael S. Klein

That is where the service, which is now located in Brooklyn, N.Y., Jerusalem and Strasbourg, France, comes in. For a fee of \$750, it matches Torahs that have already been proofread by humans against the "perfect" standard in the memories of the computers, Intel Corp.

80386-based personal computers from Dell Computer Corp. The perfect copy takes up 25M bytes on a 320M-byte hard disk.

To date, more than 3,500 scrolls, some from synagogues as far away as Australia, have been proofread.

Copies made

Each Torah to be checked is first photocopied. The photocopy is scanned page by page into computer memory. To ensure that every one of the approximately 250 columns in a Torah has been included, the system displays blowups of the corners of each scanned column to the operator manning the scanner.

After the Torah is scanned, it is compared automatically letter by letter with the standard.

The comparison process employs a number of algorithms. For instance, the "stroke-analysis" technique used in systems that recognize hand-printed characters is one such algorithm.

If an error is detected or there are any uncertainties that may be induced by discoloring of the parchment, a bell sounds. If there is a letter or word in error, the operator commands it to be stored in memory with its position by column and line.

At the end of the comparison process, which takes about two hours, any errors with the phrases in which they appear and their locations are printed out on a Hewlett-Packard Co. Laserjet II.

Crime deterrent

The printout indicating errors and the complete photocopy of the Torah are returned to the owner. Coincidentally, since the service was launched in 1984, there has been a marked decline in the once-lucrative trade of stolen Torahs because the photocopies provide a positive means of identification, Greenfeld said.

Greenfeld and his associate, Rabbi Shmuel E. Granatstein, are constantly striving to improve the technology to cope

with the many subtle variations in styles of calligraphy. For instance, they are planning to replace the present 300-dot/in. scanners with 400-dot/in. versions. The dozen or so programmers working part-time on the technology are steadily refining the algorithms, which are mostly written in C language.

Benefactors have contributed about \$2 million to the non-profit service, which has yet to break even.

When the service was introduced, the ultra-Orthodox scoffed at it. However, once it proved itself by detecting errors in Torahs that have been in weekly service for decades, the scoffers became, in Greenfeld's words, "true believers."

Mandell is a technical writer based in New York.

Torah goes to the Gulf

Among the Torahs recently proofread by Vaad Mishmereth Stam was a rare miniature Torah. The decades-old Torah, most likely the creation of a pre-World War II Polish scribe, was destined for the Persian Gulf to meet the religious needs of the approximately 1,500 Jews serving with U.S. forces in that region.

The six-inch-wide Torah, less than half the width of today's Torahs, was selected because it could be transported in a small container that would not indicate its contents. The Allied forces downplay all religious expressions other than Muslim because Saudi law does not sanction any other religious expression.

PC buyers scout new retail outlets

BY RICHARD PASTORE
CW STAFF

Personal computers? Third aisle on the left opposite the frozen waffles.

No, supermarkets are not selling PCs yet. But warehouse clubs, which sell everything from butter to bicycles at less than 9% markup, will sell hundreds of thousands of systems this year. For corporate and business buyers who are members of the clubs, these may be a lower cost alternative to the traditional dealers and mail-order channels.

Like the computer super-

store channel, warehouse clubs are aimed at cost-conscious buyers who already know what they want. "Users who don't require hand-holding can get what they want at an attractive price," said Andy Bose, an analyst at Link Resources Corp. in New York. The warehouse club is particularly suited to PC upgrade buyers, he said.

The 5% to 7% markups of national clubs such as Sam's and Price Club contrast well with traditional channel markups of up to 25%. As much as 60% of club sales are to business buyers rather than home consumers, ac-

cording to retail analyst Robert Cheadle at Montgomery Securities in San Francisco.

While a majority of these sales are to small firms, corporate customers are on the rise as budgets tighten and alternative channels become more acceptable, analysts said.

"At first, companies are suspicious. Before they order in volume, they buy two and tear them apart for evaluation," said Bryan Kerr, executive vice president of Positive Corp., a PC maker that markets its boxes exclusively through the clubs.

The domestically built Posi-

tive line, which begins with a \$1,499 Intel Corp. 20-MHz 80386SX, was extended earlier this month to include a \$3,999 33-MHz I486-based model. The high-end unit includes a 64K-byte cache, a 200M-byte hard disk, a Super Video Graphics Array monitor, a mouse and preloaded DOS 4.1 and Microsoft Corp.'s Windows 3.0. A similarly configured name-brand unit from a dealer could run \$8,000 to \$12,000.

Positive and other club vendors try to answer support concerns by offering toll-free telephone support and depot returns. Positive also contracts with dealers located near club stores to provide on-site service.

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PC Week
June 12, 1989

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DBMS
January 1990

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Reviewers find few faults with Excel 3.0

Technology Analysis — a roundup of expert opinion about new products. Summary written by Computerworld intern Derek Slater.

Three years after its most recent upgrade, Microsoft Corp.'s Excel has beaten its biggest spreadsheet rivals to the Windows-compatible market with Version 3.0. Reviewers said the new Excel is worth the wait, citing powerful analysis functions and graphics capabilities.

Performance: Because it is a heavily graphical program, Excel is not the fastest gun among spreadsheets. However, Excel 3.0 sports powerful number-juggling features such as worksheet outlining, which allows the user to graph and present only significant summary data while still manipulating less important numbers in the background. Linking or consolidating different worksheets is also easily accomplished.

Compatibility: Excel is compatible with all versions of Lotus Development Corp.'s 1-2-3 files and includes a special dialog window to help translate 1-2-3 commands into their Excel equivalents.

Graphics: Operating under Windows provides a natural advantage in graphics capabilities over DOS-based programs. Excel's charts and graphs can be rotated on any axis, labeled with icons and arrows and placed anywhere on a worksheet. Text wraps automatically around graphs where desired and can also be placed within a graph.

Database: In addition to its own flat-file database capabilities, Excel includes bundled software that allows it to import files from Microsoft's SQL Server and Ashton-Tate Corp.'s dBase III and IV.

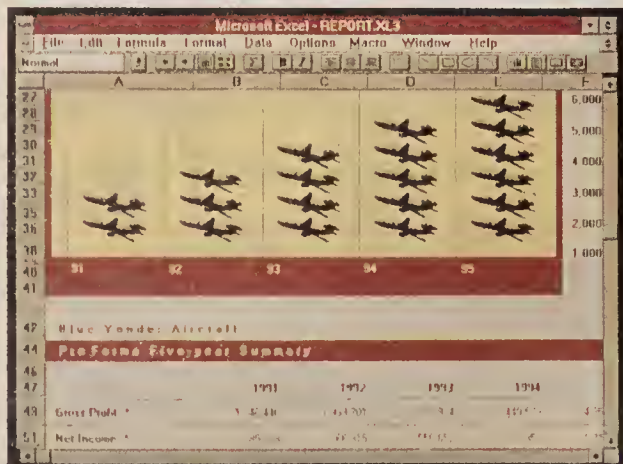
Output: What you get is what you see on the program's display. Formatting control is excellent, according to reviewers. Users can reduce print size to keep larger worksheets on a single printed page and create style sheets that make future worksheets conform to a standard output format.

Documentation: Excel's documentation has been completely revamped for the Windows version. Reviewers also noted the addition of on-line Help windows.

Ease of use: Ease of use is enhanced by the point-and-click Windows environment. A tool bar offers quick and simple cell formatting, and graphs are also easy to set up. The outliner feature enables users to handle complicated, multilevel worksheets.

Support: Microsoft offers solid technical support, reviewers said. Telephone support is unlimited and free, although not toll-free. Excel also comes with a 30-day return policy.

Value: Excel is one of the best values on the spreadsheet market, reviewers reported. Priced at \$495, Microsoft is offering the package for \$129 for the next nine weeks to users who say they are currently using another spreadsheet product.



Microsoft's Excel combines a powerful spreadsheet with the easy-to-use Windows interface

Reviews Summary

| Criteria | Infoworld | PC Week | PC World |
|------------------|-----------|------------------------------|--|
| | 1/28/91 | 1/14/91 | 2/91 |
| Performance | Excellent | No speed demon | NC |
| Compatibility | Very good | NC | Simple to convert |
| Graphics | Excellent | Superior integration | Leapfrogs major rivals |
| Database | Excellent | NC | Mainly unchanged |
| Output | Excellent | Has an edge in presentations | Brings report format to a higher level |
| Documentation | Excellent | NC | NC |
| Ease of use | Excellent | Easier than previous version | Spectacular |
| Support | Very good | NC | NC |
| Value | Excellent | NC | A new caliber of style and substance |
| Reviewer's score | 8.9 | Users will have a field day | A cornucopia of timely additions |

Numeric ratings are based on a weighted scale of 1 to 10 where 10 is best. NC: No comment. These are excerpts from reviews. Refer to actual articles for details.

RATINGS

What the experts say



Contel ASC's Remmert

• Users: Bill Remmert, manager of end-user computing, Contel American Satellite Co. (overall performance of product: 10, cost to get product up and running: 10)

"Microsoft has made a tremendous leap from Version 2.0 to this version. It's as big as the leap from Word to Word for Windows. The outlining feature, excluding certain columns from view with the click of a button, makes some things 10 times easier to do. The ability to design my own macros is also

important. The cost isn't even a question. You'll get your money back," Remmert said.

Bob Cohen, division systems manager, Baxter International, Inc. (9,8)

"The graphics are excellent, and the formatting options for a spreadsheet are really nice; it's almost like a word processing environment. It's not inexpensive, but it's a lot of product for the money," Cohen said.

Steve Alverson, project engineer, Cincinnati Milacron (9,8)

• Analysts: Amy Wohl, Wohl Associates (overall performance of product: 10, cost to get product up and running: 7)

"The interface on Excel is very appealing and very easy to use. Also, customers find feature-rich products very appealing, and right now, it has the most features," Wohl said.

Marshall Moseley, Dataquest, Inc. (8.5,8); David Cearley, Gartner Group, Inc. (8,8)

• Financials: Christopher Mortenson, Alex. Brown & Sons, Inc. (overall financial performance of product and company: 9)

"Excel is about 10% of Microsoft's revenues and earnings. Although Version 3.0 is just starting to ship, I have a very positive feeling about it," Mortenson said.

David Bayer, Montgomery Securities (10)

"Excel is the spreadsheet to beat for Windows 3.0," Bayer said.

Thomas Erickson, Wessels Arnold & Henderson (9); Jim Weil, Soundview Financial Group (9)

Excel 3.0

score:
89

| Points (maximum) | Category |
|------------------|-------------------|
| 27 (30) | Published reviews |
| 18 (20) | Analysts' ratings |
| 14 (15) | Users' ratings |
| 16 (20) | Cost evaluation |
| 14 (15) | Vendor financials |

(Maximum score: 100)

Microsoft responds

Comments from Rich Tong, product manager:

Performance: We designed Excel to run on [Intel Corp. 80286-based] machines with 1M byte of random-access memory. Excel has one of the fastest recalculation speeds out there. Most of the problems with speed come from trying to run too many applications at once. The point of Windows is to be able to load as many programs as possible. Whether good or bad, it doesn't tell you, "Hey, this is really dumb to load 18 applications."

Database: We'll continue to write drivers to support additional databases. But since most databases can convert to dBase files, you can work around this already. Also, managers can write their own browsers because the format is open-ended. The SQL Server is really the crucial thing because it will allow people integrating mainframes with personal computers to bring their database data down to the micros.

Support: We recently changed from a 30-day return policy to a 60-day policy. But the return rate is extremely low, regardless.

NEXT WEEK

► The latest version of Computer Associates International, Inc.'s Super-calc5 keeps pace with the market leaders.

Methodology: Published reviews: average of numeric scores from product reviews published by personal computer publications listed in reviews summary chart multiplied by three. All ratings are based on a 1-to-10 scale, where 10 is excellent. Analysts: average overall product ratings multiplied

by 2. Users: average overall product ratings multiplied by 1.5. Cost: average cost to get product up and running ratings from both groups multiplied by 2. Financials: average of financial analysts' ratings of vendor financials and ability to support product multiplied by 1.5.

digital™

digital update

NEWS AND VIEWS FEBRUARY 1991



INFORMATION GRIDLOCK

You're not alone if you're drowning in too much paper and electronic information. Because of the explosive growth of desktop computing and networking capabilities, any workgroup that produces volumes of documentation, and the IS people that support it, are apt to be facing this problem.

Howard Woolf, Digital's Manager of Network Application Support and Electronic Publishing, discusses how a new networked application area called Document Management offers an integrated solution.

**Too many files,
in too many places,
in too many formats?**
**Document
Management lets you
keep information on
track and flowing
smoothly.**



WHAT IS DOCUMENT MANAGEMENT? AND WHAT INFORMATION MANAGEMENT PROBLEMS DOES IT ADDRESS?

It's now fairly simple for people to create professional-looking documents on their computers, including graphics, images, and other types of information with their text, then distribute that information quickly and easily to others. And, of course, it's also much easier to revise such documents at any time.

But along with the benefits of desktop publishing have come a host of problems—electronic files that can't be located when you need them; obsolete and incomplete information; different versions of the same document in multiple locations. The problem is made worse because most documents result from the contributions of various people—writers, editors, graphic designers, and reviewers all working together to produce the final document.

Keeping track of that document from creation through revisions to final approval across workgroups, departments, and the entire organization can be a management nightmare. Equally difficult is ensuring that the document is kept current and accessible to the people who depend on the information it contains.

A good way of addressing these problems is through networked applications that integrate desktops and other systems in a client/server computing environment. That's what Document Management is all about.

WHAT SORT OF BUSINESSES WOULD BENEFIT MOST FROM DOCUMENT MANAGEMENT?

Discrete and process manufacturers such as aerospace, petrochemical, and pharmaceutical companies are all good examples of organizations that produce a massive amount of documentation and can

certainly benefit from Document Management. Both state and federal agencies, as well as organizations that deal with government agencies, have an urgent need for Document Management. For instance, the government requires the filing and tracking of millions of pages of safety documentation, technical manuals, and other mission-critical documentation from many organizations.

WHAT MAKES A GOOD DOCUMENT MANAGEMENT SYSTEM?

You should look for a Document Management system that embraces the following capabilities:

ROUTING: The ability to track, route, and store documents as they are being written, reviewed, and revised no matter what desktop application is used to create the document.

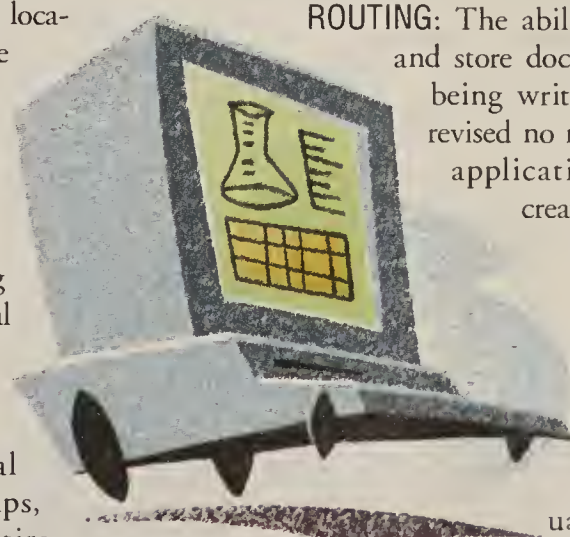
STORING: The ability to store documents in a structured text database—versions of a technical manual, for instance. These documents

should also be available to all authorized users over a network.

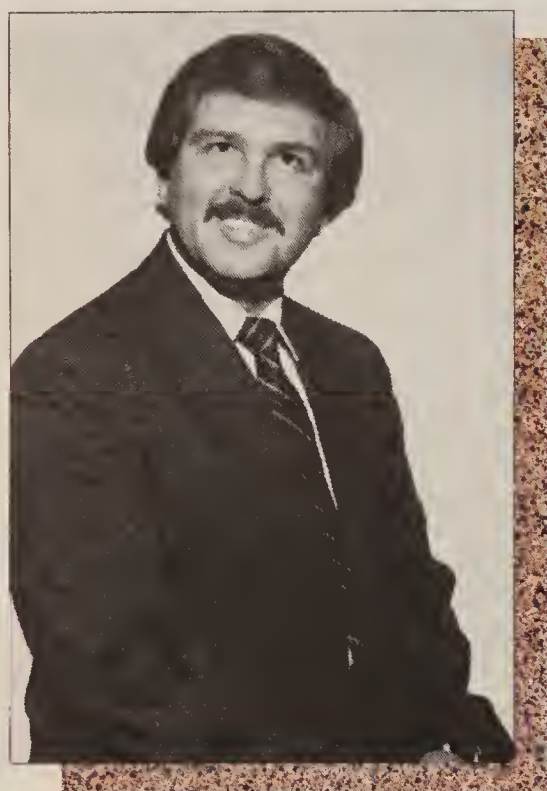
RETRIEVING: The ability of any desktop system to retrieve compound document information from within multiple applications without needing to know where the information is stored.

LINKING: The ability to link associated objects. For instance, having a maintenance manual linked to relevant OSHA regulations.

continued ►



► Document Management continued



Howard Woolf
*Manager of Network
Application Support
and Electronic
Publishing*

**"Any successful
Document
Management strategy
must address
how to get
information to and
from the desktops
in a mixed-vendor
environment."**

HOW ARE THOSE CAPABILITIES REFLECTED IN REAL PRODUCTS?

We have a variety of excellent products for Document Management, including:

- ODMS from Odesta Corporation, which works as client/server software and allows users to route documents, track revisions, and control versions of the document. Digital jointly markets ODMS with Odesta today, and plans to sell, distribute, and support a future version of this product.
- BASISplus, from Information Dimensions, Inc., which provides a large, centralized library where writers and reviewers can check out and work on documents.
- TOPIC, from Verity, Inc., which allows users working in a distributed client/server environment to retrieve documents in order of importance. Digital sells and distributes this product.
- PixTex, from Excalibur Technologies, which is an ideal application for locating information in image documents. PixTex can search documents that contain misspellings. For example, if a document has been scanned and then converted into text with an optical character reader, the chances are good it contains some misspellings—but PixTex can still find the desired information even if the words it is searching for are incorrectly spelled. Digital sells, distributes, and supports PixTex.

- EDCS II, which provides a secure structured library for engineering drawings and technical documents.

These are only a few of the many products available as part of the Digital Document Management strategy—all based on Network Application Support (NAS) services as the integration software.

HOW DOES DIGITAL FIT INTO THE DOCUMENT MANAGEMENT PICTURE?

That's a key point. Obviously, Document Management won't work unless it works for everyone who needs access to the document. There are over 40 million desktop computers in use today, and any successful Document Management strategy must address how to get the information to and from those desktops in a mixed-vendor environment.

Also, documents often include such things as graphics and charts as well as text—what we call compound documents. People who need access to documents need access to the entire document. It shouldn't matter what applications or computers are being used.

That's where Digital comes in. Thanks to our NAS software, we believe that Digital already leads in ease of inter-operating with other vendors' systems—from DOS-based PCs to Apple Macintosh systems, to UNIX workstations, and IBM mainframes. Because of NAS, all the Document Management products I've mentioned are interoperable in multivendor environments.



We're also working closely with the application vendors to ensure that their Document Management products support all the key NAS services such as Digital's Compound Document Architecture (CDA).

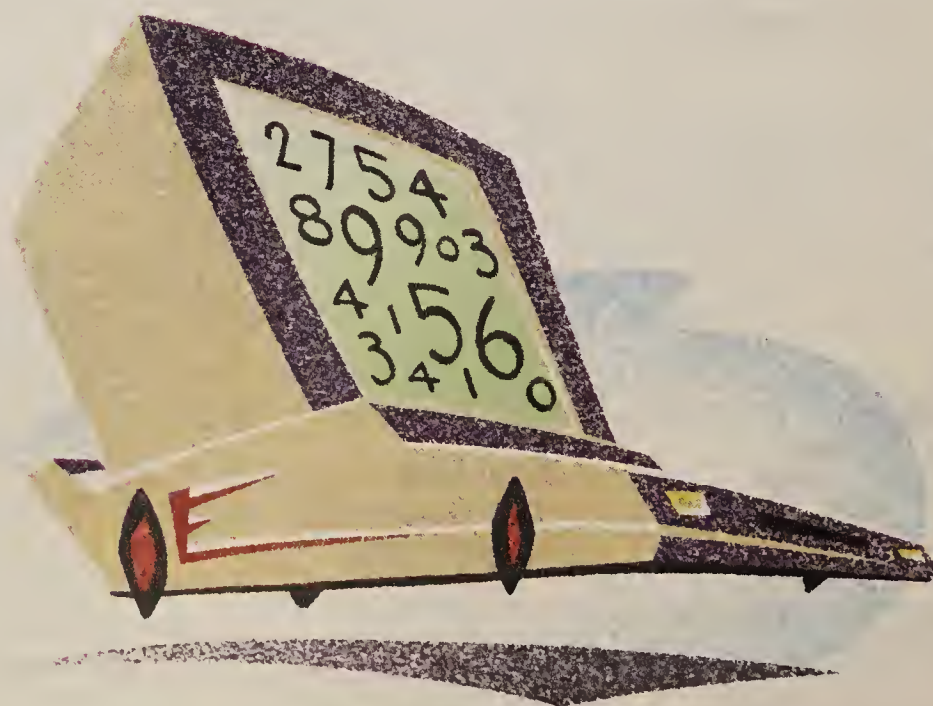
SO, ALL THESE PRODUCTS WORK USING NAS?

Yes. ODMS currently supports Macintosh and VT clients on a VMS server, and will soon be available for Motif and MS-Windows clients on a VMS server.

BASISplus supports VT, X-Windows, and MS-Windows as time-sharing clients with a VMS server. TOPIC supports the MS-Windows, Macintosh, and Motif clients, with UNIX and/or VMS servers. PixTex supports X-Window clients on a VMS server, and a RISC/ULTRIX server is under development for PixTex.

HOW DO YOU GET STARTED WITH DOCUMENT MANAGEMENT?

Everyone has their unique needs. The best way to get started is by contacting a Digital salesperson. Together, you can select products that will match your Document Management needs and integrate with your current or planned computing systems.



February 1991

digital™

New MEMORY MODULES for VAX 6000 Systems

Today's applications—whether they are database, scientific, or vector processing applications—require superior performance. Digital now offers three new memory modules to help you obtain the performance these applications demand.

Designed specifically for VAX 6000 systems, the new MS65A modules come in 128 MB, 64 MB, and 32 MB sizes. All offer marked improvements in speed, flexibility, and capacity over the existing MS62A memory.

The modules provide a smooth system growth path, working to protect your investment in existing equipment. They are forward compatible, so you can use them when you upgrade to the VAX 6000 Model 500. And they are backward compatible, so you can use them with earlier VAX 6000 systems, including Models 200, 300, and 400.

Bigger and Faster

Thanks to high-density, state-of-the-art 4-Mbit DRAM technology, the modules have larger memory capacities. When you upgrade

to the VAX 6000 Model 500, the new modules support a write-back cache that bolsters the efficiency of the system bus to make your whole system still faster.

The new memory modules' unique design gives you faster access to your memory data. On the average, the modules are 25 percent faster than the MS62A. A new streamlined memory controller design provides memory bandwidths that surpass those previously available for VAX 6000 systems. The new memory modules let you double the size of your memory, from 256 MB to 512 MB.

Flexible and Secure

The range of memory options and a new mixed-module interleaving capability give you flexibility when configuring memory. You can

**More memory
means more
performance.
And that's what
you get with
the three new
MS65A modules.**

free up slots in heavily-loaded systems by replacing your MS62A memories with the new, higher-density modules. You can mix MS65A and MS62A modules on the same VAX 6000 system (Models 200, 300, 400) and still benefit from the performance advantages of interleaving.

Flexible also means cost effective. You can buy memory in the increments that best suit your needs—32 MB, 64 MB, or 128 MB. By choosing the 128 MB module, you can save 20 percent of the cost you would pay if you bought equivalent amounts of memory in the 32 MB or 64 MB options.

Whatever new module you choose, your data is safe. The new memories are tightly integrated with the VAX 6000 system architecture—to deliver superior data integrity and high systems availability. The modules come with built-in self-test capabilities, battery back-up capability, and error detection and correction.

With Maintenance Included

In the United States, maintenance for memory is free of charge when your system is covered by a Digital service contract. This cost-of-ownership savings adds up over the lifetime of your system. System service is done on-site, so you can avoid extended periods of downtime.

For more information on configuring memory options for VAX 6000 systems, contact your local Digital sales representative, or call our Technical Consulting Center at 800-343-4040.

NEWSFLASH

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september
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december
january

New Link Between Mac and VAX VTX

A new Macintosh interface, VTXpress, is available for Digital's VAX VTX videotex product. Developed under a joint agreement with White Pine Software, VTXpress offers Mac users the power of Digital's leading electronic information distribution system while working under the Macintosh interface, including windows, icons, menus, and pointers. All the Macintosh software required to run VTXpress is included in the \$399 product.

VTXpress is compatible with Digital's PATHWORKS for Macintosh product—software from Digital enabling MicroVAX and VAX computers to act as application, data, electronic mail, and resource servers for large groups of Macintosh computers. To order or for more information on VTXpress, contact:

White Pine Software, Inc.
94 Route 101A
Amherst, NH 03031
603-886-9050

Lower Prices for MS650 Memory Products

Digital recently announced up to 25 percent savings on its 8 MB and 16 MB MS650 memory products. Designed to enhance the performance of Digital systems, and unsurpassed in reliability and availability, the MS650 memories are high-performance ECC memory products used on the following systems:

- MicroVAX/VAXserver
3300/3400/3500/3600/3700/3800/3900
- VAXstation 3200/3500
- DECsystem 5400.

License to Save for MicroVAX Users

Thanks to the new VAX/VMS Unlimited User License Upgrade program, existing MicroVAX sites that plan to upgrade before June 28, 1991 can save as much as 77 percent off the cost of the standard VAX/VMS unlimited user license. Approximately 60,000 MicroVAX II and MicroVAX 3000 system customers with time-

sharing licenses of VMS Version 4.0 and higher are eligible for the program. Call 800-DIGITAL (800-344-4825) to order, or for more details.

More Realtime Benefits

Digital's new Version 4.2 of its VAXELN real-time software provides users with support for its VAX 4000 Model 300 system, support for a half dozen new devices, and increased functionality at the kernel level. VAXELN V4.2 extends low-cost realtime support to the VT1300 X Window graphics terminal; VAXstation 2000 and VAXstation 3000 workstation graphics; graphics accelerators in the VAXstation 3100 SPX workstation and the MicroVAX 3500/3600/3800/3900 computers; the DEC Lancontroller 400 high-performance Ethernet/802.3 controller; and the RV20 Write-Once Optical Drive.

Integrating OS/2 Into the Network:

DIGITAL'S STRATEGY

Certainly you are already familiar with OS/2—the newest personal computing operating system from IBM, offering multitasking capability and virtual memory management. You know you can use OS/2 to develop and support more powerful applications than were available under MS-DOS. OS/2 includes the Presentation Manager graphical user interface and is an excellent platform for networked applications.

Of course, to get the most out of OS/2, you'll want to integrate it into your corporate network.

The following series of questions and answers addresses Digital's strategy for doing just that. (First, some foundation-building information; then to the heart of the matter.)

What is PCSA?

The Personal Computing Systems Architecture (PCSA) is Digital's solution for integrating personal computers into your total computing environment, so that they can share all of the information and resources that your business possesses.

As the architecture that underlies the PATHWORKS family of products, PCSA is based on DECnet and LAN Manager, with support for the TCP/IP transport to be offered in the future. PCSA offers basic file and print services, as well as value-added applications and utilities such as terminal emulation and mail.

PCSA support also extends to Macintosh systems using AppleTalk and AFP. In this way, Digital supports Macintosh systems within our networks by using the industry standards preferred by Macintosh users, much like we support DOS and OS/2 users via LAN Manager.

What does Digital's PATHWORKS offer that competitive products don't?

First, PATHWORKS provides interconnectivity between all Digital LANs and host systems, so you can access services from any server in the network. The PATHWORKS product family includes servers on VAX-based VMS systems, on VAX-based and RISC-based ULTRIX systems, and on OS/2-based Intel systems.

Second, PATHWORKS is based on industry-standard architectures, such as LAN Manager, MS-DOS, and OS/2 Standard Edition. Digital believes in open computing, so PCSA is not a proprietary architecture.

Third, you benefit from Digital's high-quality product engineering and state-of-the-art technology. You also receive our comprehensive service and support, plus guaranteed customer satisfaction.

Now, the key questions:

What is Digital's strategy for OS/2 support?

Digital supports OS/2 under our Network Application Support (NAS) strategy. NAS offers you transparent access to a backbone set of applications and services that are located anywhere on the network, yet are available to users of any desktop platform. Digital has licensed Microsoft's LAN Manager network operating software as the basis of our PATHWORKS for OS/2 (formerly PCSA for OS/2) product. PATHWORKS for OS/2 allows OS/2-based PCs to be used as both clients and servers.

Digital is developing a number of other OS/2 products under the NAS program. Two products which are currently available are DECwrite for OS/2, a desktop publishing application; and CDA Base Services for OS/2, a collection of tools which brings the power of Digital's Compound Document Architecture to OS/2 users.

What are the principal features of PATHWORKS for OS/2?

PATHWORKS for OS/2 gives you all of the software and documentation you need to configure an OS/2 client or server in a single package. PATHWORKS for OS/2 provides full support of the LAN Manager Application Programming Interface (API) so that you can develop distributed OS/2 applications. V1.1 includes server software which has been optimized for superior performance on IBM 386 and 486 systems. V1.1 of PATHWORKS for OS/2 will also include support for the LAN Manager Peer Services feature that lets individual OS/2 users share local disks and printers with other users, one connection at a time.

PATHWORKS for OS/2 includes DECnet network transport software, so OS/2 users can participate in DECnet computer networks. Some key features of DECnet include task-to-task communications, network file transfer, network management utilities, and NETBIOS interface support.

A PATHWORKS for OS/2 client can access file, print, and mail services of VMS, ULTRIX, and OS/2 PATHWORKS servers. You can access one or more servers simultaneously, so that all resources of the network are available to you.

The PATHWORKS for OS/2 server software also includes mail server software, allowing the OS/2 server to route electronic mail messages between PC users. Both DOS and OS/2 PATHWORKS clients can have mail accounts on the OS/2 server.

The OS/2 client mail utility lets you send mail to PC, VMS, and ULTRIX mail users. Other client applications and utilities provided with PATHWORKS for OS/2 are VT320 terminal emulation, a full-screen editor, a broadcast sender, and a broadcast receiver.

PATHWORKS for OS/2 supports the Network Device Interface Specification (NDIS). NDIS was jointly developed by Microsoft and 3Com Corporations and is a standard which allows network software and hardware to work together. When you purchase PATHWORKS for OS/2, you receive NDIS-compliant drivers for several Ethernet controllers, including the DEC EtherWORKS products. PATHWORKS for OS/2 may also be used with other vendors' Ethernet controllers, which are supplied with NDIS-compliant drivers. Digital's support of NDIS is another example of Digital's commitment to standards and to open computing.

Does PATHWORKS for OS/2 support Presentation Manager?

Yes. PATHWORKS for OS/2 utilities run in full-screen mode. Applications that use Presentation Manager windowing features are supported under PCSA, and can run in a networked environment.

What are the configuration requirements for a system running PATHWORKS for OS/2?

PATHWORKS for OS/2 V1.1 supports OS/2 Standard Edition V1.1 and V1.21 on client configurations; it supports OS/2 V1.21 on server configurations. PATHWORKS for OS/2 may be run on a wide variety of PCs, including IBM 286, 386, 386sx, and 486 models. Supported models include Digital's DECstation PCs, IBM AT and PS/2 models, as well as models from COMPAQ, Olivetti, Tandy, Toshiba, and Zenith Data Systems. A minimum of 4 MB of memory is required on client systems. A minimum of 6 MB of memory is required to run the server or Peer Services software. An Ethernet controller is also required in each OS/2 client or server system.

Is it difficult to configure PCs as clients?

Not at all. PATHWORKS for OS/2 comes with a menu-driven utility which makes installation and configuration quick and simple. You use a single utility to install the software and configure an OS/2 system as a client or server. The installation utility gives you context-sensitive help and default settings for most of the required input values, so that even a novice user can install and configure a PATHWORKS for OS/2 system.

Tax programs ease the burden

PRODUCT REVIEW

BY PETER BARTOLIK
CW STAFF

If you do your own tax returns, the question is not whether to buy a tax preparation software package, but which one to buy — and write off on next year's return.

Considering that tax preparation services charge from \$40 at the storefront to astronomical amounts for full-fledged accounting time, even a hesitant self-filer can easily justify the up-front expense of the popular software packages now available.

Last year was my initiation into this technology via Chipsoft, Inc.'s Turbotax. Emboldened by that experience, this year I decided on a head-to-head evaluation of both Turbotax, because it was familiar, and Softview's Macintax for Windows 3.0, quite simply because it was designed for Microsoft Corp.'s Windows interface.

Both scored well in terms of functionality and, most important, usability. For Windows aficionados, the choice is easy: Macintax has the point-and-click process down pat so the user can click on line 34 of Form 1040 and up pops the intimidating Schedule A for itemized deductions.

If you are comfortable with the mouse, navigating through related forms and schedules is much more convenient than Turbotax's functional but ponderous menu scheme.

Despite the absence of a bona fide graphical user interface, Turbotax is well ahead of the game in terms of intuitive assistance to the tax filer. While both packages employ checklists to determine which forms and schedules should be used, Turbotax systematically takes you

through the process of filling in data on one form that will be subsequently consolidated into another.

For example, in compiling data on an independent business, a depreciation worksheet compiled data that was pulled into Form 4562 that was then consolidated into Schedule C.

However, Macintax's reliance on Windows actually detracts from the product in a couple of areas.

First, the graphical representation of

based display format.

Secondly, while Turbotax provides a convenient pop-up calculator, Macintax ironically seems to rely on the Windows calculator, which you cannot access unobtrusively unless you are running the package in an inadequate-size window.

Both provide electronic filing options. Macintax gets a plus here because it bundles the required software right into the package, whereas Turbotax requires you to order its supplemental Chiplink disks. With Macintax, you have to mail a disk to a service bureau for transmission to the Internal Revenue Service. But with Tur-

Will they tax your system?

Chipsoft's Turbotax

- List price: \$75 (plus \$11.50 for electronic filing software; \$15 for service bureau filing fee)
- System requirements: 512K bytes random-access memory, DOS 2.0 or higher
- State versions: 44 state supplements, \$40 each

Softview's Macintax

- List price: \$99 (\$29.95 for service bureau electronic filing fee)
- System requirements: Intel 80286- or 80386-based system; 1M-byte RAM minimum; Microsoft's Windows 3.0
- State versions: 14 state supplements, \$69 each

tax forms becomes tiresome after a while. Not only does the white form representation seem glaring after spending some time in front of the screen, but the character fonts are just not robust enough for the job.

Turbotax provides the option to switch to a graphical representation, but memory is an apparent issue as I was unable to make this switch when using 640K bytes of memory on an Intel Corp. 80286-based system. The hard-core data entry seems much easier in the standard character-

botax, you can transmit via modem to its service bureau. The service bureau fee is \$29.95 for Macintax users and \$15 for Turbotax users who have to pay an additional \$11.50 for the Chiplink software.

Both service bureaus also provide for IRS direct deposit of refunds into the user's bank account. However, the electronic age still has its limitations: Filers will have to mail in the W-2 form along with a signed form that the IRS requires for electronic filing. Do we need further proof that bureaucracy is self-sustaining?

available from within any of the system modules: General Ledger, Accounts Receivable, Invoicing, Accounts Payable, Payroll and Financial Writer. Sample data and transactions, which can be used as models for customizing accounting records, are also provided.

The package supports Windows Dynamic Data Exchange (DDE), enabling hot links to other Windows applications. For example, data from one of the modules can be included in a Windows word processing document or spreadsheet using DDE. When changes are made to the module, the linked files are simultaneously updated.

The accounting modules are fully networkable and can handle an unlimited number of transactions and accounts. Switching modules is fast and simple, the vendor claimed, adding that "on-the-fly" hookups and record alterations are possible. Also featured are import/export capabilities through ASCII files as well as automatic backup and data repair utilities.

Crystal Accounting comes with a 60-day money-back guarantee. Technical support is available through Peachcare on a per-call basis or priced at \$99 for 60 minutes of telephone support. The package requires Windows 3.0; IBM's Enhanced Graphics Adapter-, Video Graphics Array-compatible or a Hercules Computer Technology Co. Hercules-compatible graphics card; and a minimum of 640K bytes of memory, although 1M byte of memory is "highly recommended," the vendor said.

keeping by Design. Peachtree officials said they are the first major software publisher to market an accounting package for the Windows environment.

Crystal Accounting uses Windows' graphical user interface to provide accounting features that are said to be visual and intuitive.

Pop-up menus and on-line Help are

tion protocol.

This architecture lets users upgrade the entire system or only specific portions "in a very cost-effective manner," Carberry said. He would not comment on when such a box would be generally available except to say it has been widely tested since the latter half of last year.

According to analysts, IBM should not wait much longer to announce some sort of multiprocessor. "Otherwise, they're going to get eaten alive" by the Intel-based competition, said Will Fastie, editor of the Baltimore-based "Fastie Report."

At least seven firms — Compaq, Advanced Logic Research, Inc., Netframe Systems, Inc., Wyse Technology, Inc., Tricord Systems, Inc., AT&T and Paralan Computer, Inc. — have announced or are shipping multiprocessor systems.

Peachtree offers accounting modules for Windows 3.0

NORCROSS, Ga. — Peachtree Software has announced Crystal Accounting, a six-module accounting system for the Microsoft Corp. Windows environment. Priced at \$495, it is scheduled to ship later this month.

The product was originally developed by Accounting by Design in Berkeley, Calif., and was sold under the name Book-

Multiprocessor

CONTINUED FROM PAGE 37

sor to a symmetric multiprocessor system, upgrade his operating software to recognize it and gain only a 60% performance improvement. On the other hand, with a uniprocessor box, he could swap the old chip for the latest generation, retain the same uniprocessor software and double the CPU performance. "We view the latter approach as the more viable in the relatively near term," Carberry said.

IBM has also been customer-testing a loosely coupled superserver, Carberry confirmed. In this system, the processors are distributed across various I/O boards, run in parallel and access separate memory. The only link is a simple communica-

Do unattended terminals expose your VTAM network?

Fact #1 Terminal users leave their terminals signed on to VTAM applications.

Fact #2 Inactive terminals consume resources and create security exposures.

Fact #3 Now you can do something about it no matter what application has the terminal's session.

The Network Center's *Timeout* component from North Ridge Software operates at the VTAM level, monitoring activity for all terminals in *Timeout's* VTAM domain.

Terminals connected to any and all VTAM applications, such as CICS, TSO, NetView, IMS/DC, etc., can be monitored and the session can be timed out based upon *Timeout* Rules. Inactive virtual sessions from Session Managers can also be terminated automatically.

Rules can be created online through SAA/CUA compliant panels. For example, Rules can be created easily to terminate VTAM sessions that have been inactive over 10 minutes. Or, Rules can be created to terminate sessions that exist with CICS after 5:00 pm weekdays. Rules can be changed dynamically.

Timeout is now available for MVS and VM VTAM environments. Contact the VTAM experts at North Ridge Software for complete information and a *Timeout* demonstration diskette. Call or FAX today.

The Network Center™

North Ridge Software, Inc.
14450 NE 29th Place, Suite 111
Bellevue, Washington 98007-7699 USA
Phone: (206) 882-2600
FAX: (206) 881-6904

Timeout and The Network Center are proprietary to North Ridge Software. VTAM, MVS, VM, CICS, TSO, NetView, and IMS DC are proprietary to IBM.

NEW PRODUCTS

Software applications packages

Metier Management Systems, Inc.'s Artemis Planner Version 2.0, a recently announced, graphical user interface-based planning tool for IBM Personal Computers, enables users to convert a desktop PC into a professional planning tool.

The product's user interface includes pull-down menus, enabling users to draw, annotate and modify plans interactively on-screen via a mouse, the vendor said.

Artemis Planner Version 2.0 is priced at \$865.

Metier Management Systems
12701 Fair Lakes Circle
Fairfax, Va. 22033
(703) 222-1111

IXI Ltd. has announced X.desktop 3, the third component of its Open Software Foundation Motif-compliant desktop management software package.

The product is a graphical user interface that features a drag-and-drop protocol that can be used to drag data as objects between a desktop and another application, the vendor said. It runs on platforms such as Sun Microsystems, Inc.'s Sun 3 and Sun 4, Digital Equipment Corp.'s Ul-

trix-based systems and Hewlett-Packard Co.'s 9000 Series 300 and 800 workstations.

X.desktop 3 is scheduled to begin shipping next month and is priced between \$175 and \$795, depending on number of users.

IXI
6274 Burleigh St.
Cambridge, England CB1 10J
(011-44) 223-462-131

Richmond Technologies and Software, Inc. has announced Version 2.1 of Maximizer, its contact management software package designed for IBM Personal Computer XTs, ATs or compatibles.

Features include Maxmerge, which automatically creates a separate set of

data files that can be transferred to other Maximizer users, and the ability to switch among separate Maximizer databases while remaining within a program.

The product costs \$395 for a single-user version and \$895 for a local-area network version.

Richmond Technologies and Software
6400 Roberts St.
Burnaby, B.C.
Canada V5G 4C9
(604) 299-2121

Software utilities

Softtrax has announced Odd, a software product that comprises three utilities frequently omitted from Ashton-Tate Corp. Dbase-compatible applications.

The product includes a utility for determining optimal field widths within a database, a duplicate and nonduplicate record detection utility and a frequency distribution analysis utility for numeric, date and character fields.

The product requires an IBM Personal Computer XT, AT or compatible, Dbase-compatible files, MS-DOS Version 2.01 or higher and 512K bytes of memory. It is priced at \$35.

Softtrax
4 Van Ness St.
Springfield, Mass. 01107
(413) 746-5175

Mapping Information Systems Corp. (Mapinfo) has introduced an add-in software tool designed for Autodesk, Inc.'s Autocad Release 11.

Mapinfo CAD Link (\$395) enables files to be transferred between Autocad and Mapinfo's desktop mapping software package. Users can access Mapinfo maps directly from Autocad, edit the files with Autocad drawing tools and save the files in a Mapinfo format, the vendor said.

Mapinfo
Hendrick Hudson Building
200 Broadway
Troy, N.Y. 12180
(518) 274-8673

Irwin Magnetic Systems, Inc. has announced an OS/2 backup software package that can be used under IBM Presentation Manager.

Eztape PM complies with IBM's and Microsoft Corp.'s Common User Access windows management guidelines for Presentation Manager. The software enables users to start any backup function from the main menu at any time without going through a set of backup steps.

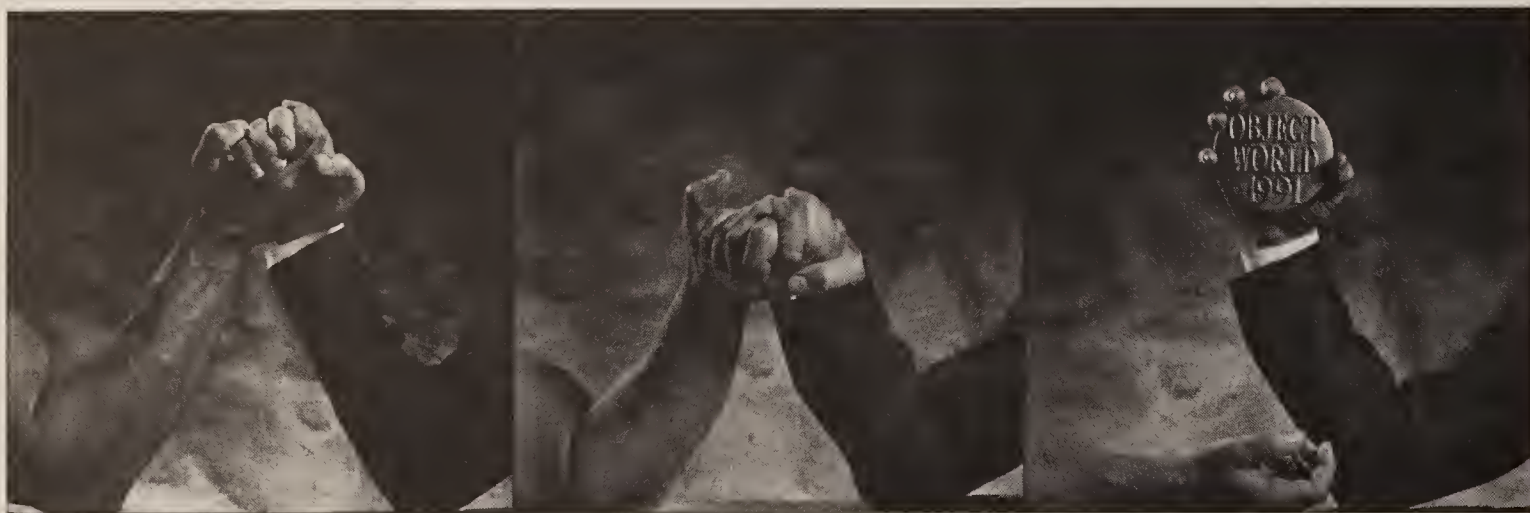
The product is scheduled to begin shipping next month and costs \$329.

Irwin Magnetic Systems
2101 Commonwealth Blvd.
Ann Arbor, Mich. 48105
(313) 930-9000

Witzend Software has announced a text editor designed for IBM Personal Computer XTs, ATs and compatibles.

The Witzend Editor (\$39) is written in assembly language and uses standard ASCII formatting. Features include drop-down menus; context-sensitive, on-line Help; and a word wrap procedure with automatic formatting. The product requires a single disk drive and 85K bytes of memory.

Witzend Software
10810 37th Ave. SW
Seattle, Wash. 98146
(206) 439-9371



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NSF network: Still plenty of work to do

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — The 45M bit/sec. upgrade to the National Science Foundation's (NSF) Nsfnet backbone is proceeding on schedule, with implementation on all 12 nodes slated for year's end. However, the foundation has other areas to address before the academic, scientific and research communities can take full advantage of Nsfnet's potential, according to Steve Goldstein, program director for interagency and international coordination at the NSF.

One major project recently started [CW, Feb. 18] is the interconnecting of domestic Nsfnet users to their counterparts on overseas regional networks. One potential stumbling block to this venture is how to ensure connectivity between the NSF and other regional net-

works. Domestic Nsfnet uses a proprietary system developed by IBM as its router. However, Nsfnet's overseas links will be based on Cisco Systems, Inc. routers, and overseas networks will have their own types of routers. None of these devices now interoperate.

The foundation faced a similar problem when it was setting up links between Nsfnet and other federal agency backbones, each of which used a different type of router, Goldstein said. The solution was to set up Ethernet hubs that accept and packetize various routers' transmissions so they can be exchanged, Goldstein added.

What the NSF is really waiting for, however, is widespread vendor implementation of the

Point to Point Protocol, a de facto standard that ensures interoperability across different routers, Goldstein said.

Another important step for Nsfnet to take is migration from Transmission Control Protocol/Internet Protocol to Open Systems Interconnect (OSI) protocols. While this has long been an NSF goal, the overseas links add urgency because European academic and scientific users are aggressively implementing the standard, Goldstein said.

On a basic level, the foundation wants to ensure that the transition to OSI is as easy as possible for users, Goldstein said. The organization is looking at services it can provide to users, such as a network information center that explains how to

access electronic mail and other Nsfnet services, he added. "Right now, if you're not in Internet, you say, 'How do I get connected? How do I get mail? Someone help me.'"

The move to OSI is also presenting NSF with some unique challenges, such as how to organize user addresses under OSI's hierarchical system, which insists that each user be tied to a specific region. Because users often belong to more than one region and change regions, this will be quite a task.



Goals and obstacles

The following are areas of the National Science Foundation's Nsfnet that need work if the high-speed backbone is to fulfill its potential:

Goal: To effectively interconnect with the users of other government and research networks.

Obstacle: Different networks use different types of routers that cannot talk directly to one another.

Goal: To provide users with easy access to each other and to Nsfnet services during the migration to OSI protocols.

Obstacles: Tracking users' changing allegiances to regional networks under OSI's hierarchical addressing scheme and helping users get comfortable with the differences between the new OSI-based services and the older Transmission Control Protocol/Internet Protocol regime.

Wireless networks pass early tests

BY JOANIE M. WEXLER
CW STAFF

When the concept of a wireless network running at local-area network speeds was introduced in technology form by Motorola, Inc.'s Radio/Telephone Systems Group last October, the industry was intrigued but skeptical as to how such a network would mea-

sociate at The Dow Chemical Co. in Midland, Mich., and an Altair beta-test user.

Jim Scott, who is running a 20-user Altair test at Boeing Computer Services, Inc., is having similar results. "Our wireless users are connected to a corporate backbone, and the performance levels are very acceptable," he said. "We've seen no

acts as a "traffic cop" that checks addresses for up to 32 Ethernet devices and forwards data packets to their destination.

An Altair user module is priced at \$3,495, and a control module costs \$3,995. Sample pricing is \$715 per port for a 30-user Altair network, not including the cost of the Ethernet adapter card that must go into any Ethernet-attached device.

"Cabling is responsible for the lion's share of network downtime. As the amount of traffic on networks continues to grow, the vulnerability of cable becomes a greater issue," said Ed Anderson, president of Computerland Corp. U.S.A., a Motorola reseller.

Industry analysts have expressed concern about the security of wireless technology in the past. Motorola said that Altair implements security at several levels, including the ability to simply pass encrypted data through the air.

In addition, the company said, Altair includes a "restrictive access" feature that allows network administrators to specify which user modules can communicate with a control module.

The wireless LAN market, which market research firm International Data Corp. predicted will reach \$267 million by 1995, is already picking up steam. Last month, for example, The Travelers Corp. said it has committed to installing six initial \$2,995 base units of Infralan, a 4M/16M

bit/sec. token-ring-compatible infrared wireless LAN from BICC Communications in Auburn, Mass. [CW, Jan. 14].

Windata, Inc., a start-up company in Northboro, Mass., said it is on the brink of rolling out a standards-based wireless LAN that uses spread-spectrum technology.

NCR Corp.'s Wavelan was first out of the gate with a spread-spectrum LAN last September. Wavelan, however, transmits data at just 2M bit/sec. speeds, which is not on a par with LAN speeds.

Hub support anticipated

Vendors of intelligent wiring hubs are expected to support the wireless medium soon. Ralph Ungermann, president of smart-hub company Ungermann-Bass, Inc., sanctioned Altair, saying that it "gives customers more choices" and is "complementary" to cabled LANs.

Wireless technology is "making waves" in the wide area, too. For example, Persoft, Inc. in Madison, Wis., recently introduced Intersect, a wireless remote bridge that connects separate Ethernet LANs up to 800 feet apart over spread-spectrum radio waves. It is said to link LANs at T1 speeds and can communicate through structures.

Laser Communications, Inc. has offered Ethernet and token-ring remote bridging with its laser-based Lace product line for some time. The Lace product — unlike Intersect — requires line-of-sight positioning but passes data at native channel speeds.

TCP/IP key element in Netware V3.11

BY JOANIE M. WEXLER
CW STAFF

The Ides of March is slated to bring Novell, Inc. users capabilities that will allow them to integrate the widespread yet proprietary Netware local-area network with other communications protocols and computing environments.

Netware V3.11, which was announced two weeks ago [CW, Feb. 11], is slated to start shipping March 15 and will come bundled with "five protocols right out of the box," said Mark Calkins, Novell's vice president of product marketing.

Perhaps most significant is the bundling of Transmission Control Protocol/Internet Protocol (TCP/IP) into the core operating system. TCP/IP represents a widespread, de facto standard for communications protocols that are often "spoken" over Unix-based networks. TCP/IP networks cannot speak to Netware LANs, which run proprietary IPX/SPX communications protocols, without one set of protocols being converted to the other by a gateway function.

"Third-party gateway functions are cumbersome and mem-

Continued on page 56

Cable cut

Motorola's microwave-based local-area network eliminates the need for wires connecting desktops to the wall-mounted control module



CW Chart: Doreen St. John

sure up to its cabled counterparts.

Motorola turned its wireless technology into a microwave-based Ethernet-compatible product called Altair at the recent Network '91 show in Boston, and other vendors are jumping into the market.

"Our users find their response time to be the same and haven't noticed any difference in the way they interact with the network," commented Richard Shankle, telecommunications as-

surance difference between air and wire."

Shankle said his company's three- to five-year future "definitely includes wireless," and he added he is hoping for a wireless product that merges both voice and data applications.

Motorola's Altair consists of a user module, which connects to six Ethernet devices via thin coaxial cable and transmits data across low-frequency radio waves to a centrally located control module. The control module

The Death



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EMC²

Niagara Mohawk looks to tap the power of networking

ON SITE

BY JIM NASH
CW STAFF

SYRACUSE, N.Y. — Enticed by the possibility of increasing database access by as much as 25%, Niagara Mohawk Power Corp. is moving some of its employees off the mainframe and onto personal computer-based networks.

The upstate New York utility company

sees local-area networks as one way of boosting the efficiency of work groups using specialized data that is now accessed through an IBM 3090 Model 400S. Niagara Mohawk even expects to see modest savings in the process.

Frank Mantha, Niagara Mohawk's information center supervisor, estimated users will access data 10% to 25% faster once the data is downloaded from the mainframe. He said the company also anticipates faster in-house software devel-

opment and upgrades for network users.

Mantha said Niagara Mohawk could save \$2,000 annually for every mainframe user who can be switched to a networked PC. It is not yet clear how many of the 5,000 employees will eventually be moved to PCs, he said.

A typical four-person department accessing the mainframe a total of 14 hours each day will be charged \$12,000 per year for mainframe access, Mantha said. A one-time expenditure of \$10,000 buys that department PCs, a printer, networking software and support for one year.

Mike Cullen, manager of information systems, said Niagara Mohawk will continue to exploit the strengths of the mainframe: central control, disaster backup, recovery, support and security.

Cullen and Mantha said only selected business applications will be transferred to the company's 12 IBM OS/2 LAN Server and three OS/2 Extended Edition networks.

By March, at least one work group will be using such a transferred application that records fixed assets at one of Niagara Mohawk's two nuclear plants. The software, developed on IBM's MVS/XA operating system, is written in Information Builders, Inc.'s Focus, Mantha said.

"The justification [behind moving applications onto networks] is to be able to put everyone in their own MVS environment," said Louis Kowalski, associate senior systems analyst in the company's management systems and services department. "That way, they have 100% of their own CPU, and you're not vying for any resources the way you have to on a mainframe."

Kowalski said his department makes a recommendation on whether an application goes on Niagara Mohawk's mainframe, networked PCs or 3,126 stand-

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EXTENDED EDITION'S PROMISE is that you can merge data from it and DB2. If it does, that will be another point in favor of downsizing more applications."

FRANK MANTHA
NIAGARA MOHAWK

alone PCs. About 850 of the stand-alones have micro-to-mainframe connections. Mantha said decisions about which applications to use are made on a case-by-case basis. "The major factors are how many people will be using it and whether the application is needed across several departments."

The 3090 currently holds 90 to 100 systems applications, including IBM's Netview, according to Kowalski. Niagara Mohawk is waiting to see how well OS/2 Extended Edition works in partnership with database management systems on the mainframe. "Extended Edition's promise is that you can merge data from it and DB2," Mantha said. "If it does, that will be another point in favor of downsizing more applications."

All corporate information programs such as the company's in-house payroll and accounting applications will remain on the mainframe, Cullen said. Typically, if there are more than one dozen users for an application, it goes on the mainframe, Kowalski said.

Niagara Mohawk already has in place a nascent enterprisewide network hooking LANs to the mainframe in Syracuse via the company's own telephone lines or in-house microwave transmissions. All networks have either token-ring or coaxial cable adapter cards.

Niagara Mohawk is working to ensure that data remaining on the mainframe can be accessed by PCs. The company bought 20 licenses for Software Publishing Corp.'s Infoalliance database integration software. The licenses allow 20 networks to access Infoalliance. Kowalski said Infoalliance has been used to build a directory of users combining Ashton-Tate Corp.'s Dbase II and OS/2 databases.

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Netware

FROM PAGE 49

ory hogs," commented Francis Paquin, a LAN support and design consultant at Ontario Hydro, a large Canadian utility based in Toronto. Paquin runs 8,000 Novell nodes in addition to seven other computing platforms. He said he is anxious to

get his hands on Netware V3.11 because "the only common denominator among my platforms is TCP/IP."

The Novell-engineered TCP/IP capability in Netware V3.11 will allow the tunneling of IPX through TCP/IP internetworks to connect Netware servers across the internetwork, routing of TCP/IP packets from one LAN to another, Simple Net-

work Management Protocol support and other functions.

Prices are \$3,495 for a 20-user version, \$6,995 for a 100-user version and \$12,495 for a 250-user version.

"The only disappointments are the pricing, which has always been extravagant at Novell, and the lack of a 500-user 3.11 version," noted Nigel Newsham, one of Paquin's colleagues at

Ontario Hydro.

Paquin added that he just upgraded his 250-user version of Netware 286 Version 2.15 for \$10,660 and could have saved about \$1,300 had he known that V3.11 was coming and moved straight from Version 2.15 to V3.11.

Novell is aiming to address the enterprise network with the addition of TCP/IP and other

protocols as well as with its recent reseller and licensing agreement with IBM [CW, Feb. 18]. Appletalk, Open Systems Interconnect (File Transfer, Access and Management) support, Network File System file and print services for Unix clients and hooks to IBM's Netview enterprise network management system will be available in V3.11 as extra-cost options.

Hayes eyes niche in networking

BY CAROL HILDEBRAND
CW STAFF

Hayes-compatible is certainly the standard in the personal computer modem market, but what about local-area network operating systems?

Hayes Microcomputer Products, Inc. recently stepped further into the LAN arena with the introduction of Lanstep, an operating system targeted for small and medium-size businesses and work groups.

A key function of Lanstep is its ease of installation and maintenance, according to Hayes' spokesman Joe Fuller. "You don't need a full-time network administrator or even a LAN expert on-site," he said. "Someone with a working knowledge of DOS and familiarity enough to install a network interface card can install the product and actually serve as system manager."

Beyond beginner

Fuller said he expects the system to cover entry-level customers but added that it expands to handle midrange networking needs as well. "It's designed to provide a growth path for customers eventually expanding their network," he said.

The product is the first roll-out from Hayes Canada, a division formed from the acquisition of Waterloo Microsystems, Inc. in December. Lanstep provides file and printer sharing. It is also IBM Netbios-compatible.

The system supports Ethernet, token-ring and Arcnet and has built-in electronic mail.

The announcement was met with skepticism. "We need some standards; we don't need yet another operating system," said John Girard, senior analyst at New Science Associates, Inc. in Southport, Conn.

The operating system is priced at \$595, but that can be misleading, Girard said: "It's a small price to pay to buy it off the shelf, but look what you're going to have to pay in person-years when you add it to the load of systems that have to be reconciled later."

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Synoptics airs customer support plan

BY JIM NASH
CW STAFF

While it lacks the skill of downhill skiing and the grace of gymnastics, finger-pointing is so well practiced in some circles that it could end up as an Olympic sport.

One of those circles is networking customer support, and some vendor firms are promoting service-and-support agreements that tie in many related companies. Synoptics, Inc. in Santa Clara, Calif., recently began to showcase its version of the new agreements, called the

Customer Support Affiliate Program.

AT&T, Hewlett-Packard Co. and two other firms have signed on to the program, a Synoptics spokesman said. Each will receive technical training and access to advanced support and resources from Synoptics. The

aim, according to the spokesman, is to give network administrators one vendor to call for network help.

Steve Ehlerding, systems engineer at Ford Motor Co.'s Central Glass Division, said, "All you hear from [vendor] reps is, 'Well, that's not our equipment.'" The division, in Dearborn, Mich., is installing an integrated voice, video and paging system manu-

factured by five major vendors.

Synoptics and AT&T are two of the contractors, Ehlerding said. As part of Synoptics' new support program, AT&T will co-market, service and support Synoptics wiring products. HP will work with Synoptics to solve problems, sharing resources and publicly available technical information.

The agreement is not unique for Synoptics. For the past year, it has had a similar, but separate, program in place with Digital Equipment Corp. However, the latest offering is the first time the company has played up such a pact, according to Synoptics.

Ehlerding said he has not heard of a program similar to Synoptics', noting, "I do think customers will force [similar] agreements on a lot of companies."

Jeff Kaplan, an analyst at Ledgeway/Dataquest in Lexington, Mass., added, "We're now seeing companies making a strategic decision to ally themselves with an assortment of service and production companies for the purpose of building a support bond" with customers.

Strategic manufacturing alliances designed to use the expertise of two or more companies on a new product or technology have given birth to the new support alliances. Compaq Computer Corp. and Apple Computer, Inc., he said, both have made low-key support agreements with other vendors.

Many companies that strike such agreements are recognizing that "service and support is not the way they are going to win," Kaplan said. "It's still important, and they've allied themselves with good firms." However, they have decided to put more money into research and development, he said.

BIT BLAST

Price cuts for 3+ Open

Microsoft Corp. is discounting its LAN Manager Version 2.0 network operating system for users upgrading from 3Com Corp.'s 3+ Open and 3+ Share software. Both 3Com products are being absorbed by LAN Manager. Reduced prices will range from \$595 for a 3+ Open Entry system to a five-user LAN Manager, to \$995 for 3+ Open to a LAN Manager 2.0 server.

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NEW AT NETWORLD '91

The following were among the products introduced this month at Networld '91 in Boston.

Gateways, bridges, routers

Madge Networks, Inc. unveiled a token-ring-to-token-ring source-routing bridge that supports unshielded twisted-pair and shielded twisted-pair wiring operating at 4M or 16M bit/sec.

The Smart 16/4 AT bridge comprises two Smart 16/4 AT bridge nodes and a source-routing bridge program that can

reportedly be installed in any IBM Personal Computer AT or compatible. The product can forward 28-byte frames at a maximum speed of 8,500 frame/sec.

The product is scheduled to ship in April and is priced at \$3,995.

Madge Networks
1580 Oakland Road
San Jose, Calif. 95131
(408) 441-1300

Cabletron Systems, Inc. has introduced gateways that tie its Remote Lanview and Spectrum network management platforms into IBM's Netview mainframe-based management system.

Spectrum, Cabletron's Unix-based network management software package, can be directly linked to Netview via a built-in Systems Network Architecture (SNA) gateway. The gateway uses Brixton Systems, Inc.'s SNA interface software to communicate with the Netview interface. A gateway for Remote Lanview/Windows, a midrange network management platform, connects to the SNA environment via IBM's Netview PC.

The Spectrum and Remote Lanview/Windows gateways are priced at \$11,995 and \$5,995, respectively. Both are scheduled to begin shipping in mid-April.

Cabletron Systems
35 Industrial Way
Rochester, N.H. 03867
(603) 332-9400

Network management

The Network Products Division of Lansystems, Inc. has announced Lansight Version 2.0, a network management software package that enables users to view, control and monitor workstations, file servers and special-purpose servers on a Novell, Inc. Netware-based local-area network by using a single program.

The product allows administrators to communicate on-line with users and respond to their needs by executing programs from a remote workstation and sending files to user-accessible areas of the network.

Lansight Version 2.0 also features configurable hot keys and support for 43- and 50-line text modes. A single-server unlimited license is priced at \$395.

Lansystems
300 Park Ave. South
New York, N.Y. 10010
(212) 473-6800

NEW PRODUCTS

Gateways, bridges, routers

Ungermann-Bass, Inc. has announced a multiple serial port bridge/router designed to connect devices on remote Ethernet networks.

The Access/One ASM 8320, part of a line of multiprotocol bridge/router modules designed for Ungermann-Bass' Access/One smart wiring hub, is a hub-based router that reportedly provides token-ring and Ethernet connections. The product can also provide Fiber Distributed Data Interface and Apple Computer, Inc. Macintosh network connections. It can be configured with one or two serial ports and can serve as a remote or local router, according to the vendor.

The device can route protocols concurrently, and multiprotocol routing or bridging can be done on the same port, the vendor said. Routing can also reportedly be performed via point-to-point serial lines or via private or public X.25 data networks.

The ASM 8320 is priced at \$7,495. A single-port version costs \$4,995, and bridging/routing software is \$995. An X.25 software option is priced at \$495.

Ungermann-Bass
3900 Freedom Circle
Santa Clara, Calif. 95054
(408) 987-6509

Local-area networking software

Digital Equipment Corp. has announced Vaxeln Window Server, a layered software package designed to allow users to simultaneously access multiple hosts via Decnet or Transmission Control Protocol/Internet Protocol or both.

The product allows users to access applications running under VMS or Ultrix and features support for Vaxstation Models 2000, II, 3200, 3100 and 3500.

The product is licensed at \$570 per Vaxstation, and a media kit for the host VAX system costs \$310.

DEC
186 Main St.
Maynard, Mass. 01754
(508) 493-5111



EDUCATION DEVELOPMENT FOUNDATION

The East-West Education Development Foundation, a not-for-profit foundation, is seeking donations of surplus personal computers and peripherals for placement in educational institutions in the USSR and Eastern Europe. The goal of the Foundation is to introduce information technology into the educational system of those countries evolving toward a democratic, free market society. By educating the students on the power of information technology, they will be better equipped to compete in the global market of tomorrow.

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Boston, MA 02116
Tel: (617) 542-1234
Fax: (617) 542-3333

*Under IRS Section 170(e)(3), corporations which donate their inventory (property sold in the normal course of business) to certain charitable educational organizations, receive an additional tax benefit. The deduction will be the total of (a) the donor's tax basis in the donated inventory, plus (b) one-half of the difference between the inventory's tax basis and its fair market value, (c) any incidental costs associated with donating the inventory, such as shipping, postage or warehousing.

EXECUTIVE TRACK



Donald N. Reeves was named to the newly created position of senior vice president of systems at **R. R. Donnelley & Sons Co.**, a large Chicago-based printer of catalogs, magazines, books and computer documentation.

Reeves, 54, is part of the company's recently restructured information technology unit. He is responsible for integrating the operations and information systems of the unit's key operating groups.

Reeves joined Donnelley in 1959 as a sales trainee. He became head of the financial printing operation in 1988.

A native of Minneapolis, Reeves is a graduate of the University of Minnesota.

The **Internal Revenue Service** announced two recent IS appointments:

John A. Ressler was named assistant regional commissioner of data processing for the IRS Southeast Region. He assists the regional commissioner in planning and coordinating returns processing, computer services, telecommunications, revenue accounting and other functions.

Ressler was most recently assistant director at the Memphis Service Center, a position he had held since 1988. Before that, he was director at the IRS office of user requirements in Washington, D.C. He joined the IRS in San Francisco in 1969.

Ressler holds a bachelor's degree from the University of Oregon in Eugene, and a master's degree from New Hampshire College in Manchester.

Richard P. Oakes was named projects director for the service center support system and corporate systems modernization transition for IS development.

Oakes had been chief of the collection systems branch since 1984. Before that, he was chief of the automated data processing standards branch for one year. He joined the IRS in 1971 as a computer programmer in Washington, D.C. He holds a bachelor's degree in IS management from the University of Maryland in College Park.

Being the best in business

Fedex CEO Smith credits effective use of technology as key to his \$8 billion firm

BY JOSEPH MAGLITTA
CW STAFF

Federal Express Corp. Chief Executive Officer Frederick W. Smith doesn't have a personal computer on his desk. "I never have liked to type," admits the amiable founder of the world's largest express transportation company.

But don't be fooled. Smith's Memphis office is among the few corners of the \$8 billion company that doesn't boast the latest computer and telecommunications technology.

Since its founding in 1973, Fedex has been known as a technology company. The firm that pioneered airbill bar coding uses multiple vendor systems and highly distributed computing to handle 14 million transactions daily. Last year, it spent more than \$243 million on information technology.

It's no surprise that Smith, 46, credits the effective use of technology with Fedex's having won the 1990 Malcolm Baldrige National Quality Award. Technology, Smith says, "is absolutely the key to our operations."

To keep abreast of new developments, Smith, a Yale graduate and former U.S. Marine Corps officer, reads voraciously, consuming computer and defense trade newspapers, Wall Street analyses and business publications. He has strong opinions on technology and how it should be used:

• On the role of information technology in quality:

Smith says the quality goals that technology must support at Fedex are as simple as they are awesome: "100% on-time deliveries, 100% accurate information on every shipment to every location in the world and 100%

Continued on page 64

THE CEO VIEW



George Lange



The man: Frederick W. Smith, 46; B.A., economics, Yale University, 1966; Captain, U.S. Marine Corps., 1966-1970

The firm: Federal Express is the world's largest express transport firm, handling 1.5 million daily shipments to 127 countries

Accomplishments: Construction of worldwide tracking system using handheld computers, vehicle on-board systems and 11,000 computers at customer sites to provide real-time information on package location almost instantly

Future goals and projects: Reduce error index to one-tenth of the present size by 1995, while increasing volume of shipments by two to three times. Continue development of the Cosmos² relational databases and distributed processing systems

Smaller may be better in health care IS

BY J. A. SAVAGE
CW STAFF

Chief information officers at large health care organizations are beginning to consider open systems and networked systems under pressure to control the spiraling cost of health care.

However, smaller hospitals, with more flexibility and fewer resources, appear to have already embraced the open systems concept.

This dichotomy in awareness and implementation of open systems showed up during the annual Health-care Information and Management Systems Society conference in San Fran-

cisco earlier this month.

"Industry says it's had enough [of high health care insurance costs], and they say they're not going to pay anymore," said Ward Keever, senior vice president of information systems at the Medical Center of Delaware in Wilmington. He admonished other CIOs to consider nonmainframe-based solutions, largely networking, to improve the quality and cost of service. "But I question whether many of us have strategic plans to deliver transformed health care," he said.

CIOs from other large institutions acknowledged that health managers should be looking into the less expensive Unix-based systems but relegated their current use to

specialized applications such as research and imaging.

"The large institutions have a paradigm paralysis," said Stephen Wood, director of IS at Middlesex Hospital in Middletown, Conn. "They think of Unix as a small box with no power."

Ludwig Johnson, vice president of IS at The Stamford Hospital in Stamford, Conn., agreed. "There's not a lot of consciousness in health care about Unix; the larger institutions are entrenched in IBM mainframes," he noted.

Obstacles to open systems in health care include the lack of standards. "Other industries, like financial institutions and airlines, have standard methods of operation," said Lynn Schatek, director of IS at Stanford University Medical Center in Palo Alto, Calif.



NEA program hopes to turn PC into teacher's newest pet

BY ELLIS BOOKER
CW STAFF

Skip the apple. Give the teacher a PC.

Education advocates are calling for putting personal computers in the hands of more teachers. However, the National Education Association (NEA), recognizing that cash-strapped public schools are unlikely to get "a PC on every desk," is trying a different tactic to expose its members to PC technology.

Last summer, the Washington, D.C.-based NEA began Edstar, a project to sell computers at cut rates to teachers for use at home. The computers would have to be easy to operate and preloaded with appropriate software and templates.

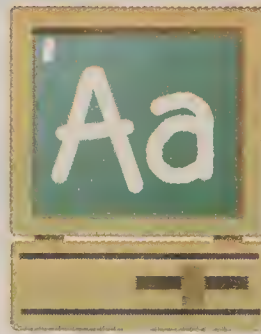
A pilot of the program began late last month in Tampa and Clearwater, Fla., where NEA, the nation's largest teacher group, has about 10,000 members.

For \$2,249, NEA members will be able to purchase an IBM Personal Sys-

tem/1 with printer. The so-called NEA Edstar Special Edition — a \$3,000 value — will also come loaded with Microsoft Corp.'s Works integrated software. Other preloaded programs include applications for tracking student grades and attendance as well as a desktop publishing program for creating newsletters.

Join the club

The PCs will also come loaded with communications software for the Prodigy national on-line service, which will soon have an Edstar club to answer teachers' technical questions and allow them to share information. NEA members will be



able to get 15 months of Prodigy for the price of a three-month subscription.

A Macintosh Edstar configuration from Apple Computer, Inc. will also be available soon, according to NEA officials.

Arleigh Greenblat, director of special services at the NEA, estimated the program will sell 350,000 to 450,000 Edstar computers to its 2 million members during the next five years.

"We are very proud of the fact that we are on the leading edge. NEA will help literally

tens of thousands of teachers get comfortable with this technology," Greenblat said. He added that about 30% of NEA members currently use computers at home, but many of those systems are old or discontinued brands.

Christine Flynn, who teaches 6th grade English at General Wayne Middle School in Malvern, Pa., is one of the first NEA members to buy an Edstar system. A self-described computer illiterate, Flynn said she has high hopes for using the computer to better manage her at-

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"I THINK THE biggest issue in the '90s is how technology will be used in assessing students and schools."

DAVID WALLACE
CHRISTA MCAULIFFE INSTITUTE

home administrative chores such as grading her classes. She admitted that getting a PC was necessary to keep pace with her precocious pupils. "My students know more about this stuff than I do," she said. Computers may be able to help the educational system in general, according to Clifford Cox, chief information officer at the Chicago Public Schools. Cox said he hopes more data on students, teachers and schools will mean a more methodical understanding of what works and what does not work in education.

"I believe we're going to be able to evaluate the impact of educational programs," he said. "Right now, frankly, [education] is a lot about politics and subjective assessments."

The broader view

However, David Wallace, director of the Christa McAuliffe Institute at the National Foundation for the Improvement of Education, an independent group associated with the NEA, wants educators involved in the development of systems for evaluating students and curriculum.

"My concern is that unless we look at broader uses of the technology, we won't get a full picture of the student's performance and potential," he said.

Collecting test scores is not enough, Wallace said. He noted that some progressive school districts are building student "profiles" using test scores, writing samples and videotapes of projects. "I think the biggest issue in the '90s is how technology will be used in assessing students and schools," Wallace said.

This and other issues will be on the agenda when the NEA holds its conference focusing on technology March 8-10 in San Francisco.

BOOK REVIEW

Advice for the joblorn, their companies and their managers

WHY THIS HORSE WON'T DRINK

By Ken Matejka
Amacom, \$22.95

"What would you think if you were a horse, and I told you to head toward the water and then held a bunch of carrots in the opposite direction? Confusing, isn't it? We wouldn't do that to a horse, would we? Then why do we do it to people?"

This is the foundation of Ken Matejka's fast-reading and sometimes humorous book on how to motivate employees.

The 206-page book is well worth a read by information systems managers and employees who are accustomed to the dictatorial management style described above. Managers get a chance to look at their role in employee problems and to receive some good advice on how to deal with the variety of people they work with, whether they be dissatisfied programmers, annoying users or an unbearable chief executive officer. Employees will discover ways to deal with "baffling bosses" and may get a bit of insight into themselves at the same time.

The author breaks the subject into four sections: "What are we doing instead of managing performance?" "Managing payoffs to get maximum effort," "Turning on turned-off employees" and "Managing commitment to get results." Each section is divided into short chapters that end with "action exercises" intended to help readers apply the information to their own companies.

Matejka, who is a consultant and professor of management at Duquesne University's School of Business Administration in Pittsburgh, says most firms, managers and employees in the U.S. suffer from "diseases of excellence." These diseases "occur when great amounts of effort are expended on being excellent at unimportant things or excellent in the wrong directions," he says.

Ailments such as "corporate elephantiasis," in which corporations grow beyond their ability to react effectively, and "management by mind reading," in which managers assume their subordinates know what is expected of them without ever telling them, restrict U.S. companies' ability to compete in the world market, Matejka claims.

After describing the problems that affect companies' corporate culture, the author suggests a variety of techniques for more effectively managing people. His methods, based on behavioral psychologist B. F. Skinner's theories, work from the idea that "people tend to repeat behavior that is rewarded, avoid behavior that is punished, and drop or forget behavior that produces neither."

This may seem straightforward, but as Matejka points out, putting theory into practice is not easy. Determining what people consider to be rewards or punishment can require considerable effort. But the effort is worth it because improper use of reward and punishment systems leads to lack of commitment, a decrease in productivity and loss of good staff.

Even with well-tuned reward systems, managers will encounter dissatisfied staff

members. The book offers advice on how to deal with problem employees.

Matejka first describes techniques for identifying the "problem self." He invites the reader to look for "blind spots" and "hidden biases" that might be the real causes of problems at work. He then goes on to discuss techniques for overcoming these shortcomings.

Chapters on dealing with "baffling bosses" and "difficult employees" stress taking a caring approach and trying to find a middle ground on contentious issues, tempered with the advice that people should not waste their lives finding a solution to

an unworkable situation. To that end, Matejka also offers counsel on how and when to quit and under what circumstances to fire someone.

The final chapters of the book promote techniques to enhance employee ownership of work and to build commitment to the company. Matejka is a strong proponent of employee participation and delegation of authority.

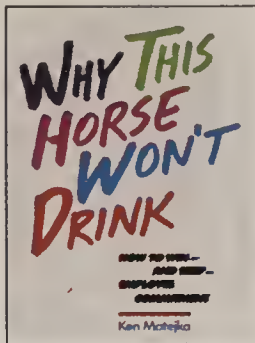
One real-world example he uses to illustrate such methods is the Skippy Peanut Butter plant in Little Rock, Ark. Matejka describes the plant as having 130 employees and no traditional line managers. Teams of workers decide the best way to accom-

plish company goals and then act accordingly — with great success. His answer to why this experiment has not been applied elsewhere? Managers' fear. "If workers can achieve goals themselves, then why do companies have all those managers standing around?" he explains.

While readers will find no radical new ideas here, they will find a carefully constructed description of the problems facing people in most companies and a series of possible solutions to them. Common sense would seem to dictate most of the answers Matejka proposes, but as the author writes: "Common sense isn't very common and often makes little sense."

CHRISTOPHER LINDQUIST

Lindquist is a *Computerworld* copy editor.



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- **X.25** — Microdyne; NSA
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Created by Dayner/Hall, Inc., Winter Park, Florida

Fedex

FROM PAGE 61

customer satisfaction."

The task is enormous. Fedex delivers 1.5 million packages every workday to 127 countries around the world with the help of its 420 aircraft, 94,000 employees and 30,000 computer- and radio-equipped delivery vehicles.

The entire quality process depends on statistical quantification, according to Smith, which in turn depends on state-of-the-art technology. "That measurement system is the key link in our overall quality effort. Without it, there would be no quality, no Cosmos or Cosmos 2 or Cosmos²," Smith says, referring to the company's various package tracking systems.

"We had to come up with a system that actually measured our performance on every transaction — regardless of the fact that we're talking about hundreds of thousands of transactions," Smith explains.

"We now have two measurement systems, which are absolutely the key to our operations. Quite frankly, they are why the company received the Baldrige Award.

[You must have] the ability to manage information on a real-time basis and be able to slice and dice it to really understand


what's happening in the operation. Whether it's the number of rejects per 10,000 units of widgets or measuring the SQI indicator at Fedex, if you don't have the ability to measure that and improve on it, then you're not going to be effective. And, in most cases, that has to be produced by the application of information and telecommunications technology."

Smith can barely contain his enthusiasm about the systems — or technology in general. "It's amazing," he says. "You go into [Cosmos] and ask where that shipment is, and 99.99% of the time it's going to tell you within a very short period of time exactly where that thing is. In fact, it's generally limited by the time it takes the systems to dial up and get into the computer."

• On measuring service quality:

"We use what we call SQI (pronounced sky) service quality indicators. We have 12 things that we know disappoint our customers, and we measure them every single day — how many packages were delivered on the wrong day, how many were delivered on the right day, how many packages were delivered late, how many we damaged, how many billing corrections we had to make and things like that.

These 12 indicators are weighted in terms of the way



George Lange

"YOU MUST HAVE
the ability to manage
information
on a realtime basis...
to really understand
what's happening
in the operation."

Fred Smith
Chairman and CEO
Federal Express

they are viewed by the customer. If we lose a package, it's rated 10 times more than if something is a little bit late. We measure it every day there is a mathematical measurement of Fedex service levels."

• On Fedex's philosophy of information technology:

"Our approach has always been more pedestrian than a lot

of people. I have always felt . . . that the application of information and telecom technology has to be very incremental and very user-friendly. Its main goal must be to improve quality one way or another, whether it's the quality of the employee's work life or the quality of the information to the customer. [We don't do] what a lot of people have tried to do — use technology to save labor or to be Big Brother to employees."

• On technology spending:

"We certainly are pouring the coals, trying to exploit information and telecommunications advantages. We do a lot of justifying; we don't want to just spend money for the hell of it. We think we understand where the high leverage points are, and when we put the money in there we can get a good return on it."

• On tracking technology's success:

"We monitor the rollout of all our strategic projects, many of which are information- and telecommunications-based. Presentations are made monthly to the entire senior management group of 12 people, which includes the chief operating officer and the chief information officer."

• On organizing information systems:

"We consider our information

technology division a line organization; it's an operating unit that is absolutely involved in the day to day operation of the company. We measure its performance. I'm just as close to the information technology division as to our sales division — and the salespeople are the ones who bring in all the bacon."

• On IS project failure:

"[Unsuccessful projects] are usually run by people who have unrealistic expectations of human nature on the one side and funded by corporate executives who have a very poor knowledge of what the technology can do on the other side. I think that people who follow that model in the future are going to be competitively annihilated."

Federal Express uses a team approach that gives IS a degree of participation unmatched in most organizations. Smith depends heavily on COO James L. Barksdale, a former IBM executive who previously ran Fedex's Information and Telecommunications Division, and CIO Ron J. Ponder.

Because of his appreciation of technology, Smith keeps his IS staff hopping. "I keep asking for the moon, and they keep saying they can only provide a small satellite," he says. Judging by Fedex's recent technological accomplishments, that may be enough.

CALENDAR

The U.S.' largest conference on intercompany electronic payment and data interchange, the fourth annual Corporate EFT/Financial EDI Conference, will be held April 7-10 at the Palmer House Hotel in Chicago.

Some 70 workshop sessions, mostly by corporate users of electronic data interchange (EDI), will outline steps to cost-justify, implement and integrate EDI with other corporate information systems.

For registration or information, contact Ruth Blalock, University of North Carolina Business School, Chapel Hill, N.C. (919) 962-9630.

MARCH 17-23

Guide 79. Anaheim, Calif., March 17-22 — Contact: Guide Headquarters, Chicago, Ill. (312) 644-6610.

Conference on Multimedia and CD-ROM. San Jose, Calif., March 18-20 — Contact: Cahners Expositions Group, Customer Services, Stamford, Conn. (203) 964-8287.

Directions '91. Boston, March 19 — Contact: International Data Corp., Framingham, Mass. (508) 879-6700.

Making the Investment in Imaging. Marlboro, Mass., March 19 — Contact: Monica Falzone, AGS, Wakefield, Mass. (617) 438-0680.

Usenix Symposium. Atlanta, March 21-22 — Contact: Usenix Conference Office, El Toro, Calif. (714) 588-8649.

MARCH 24-30

DB/Expo '91. San Francisco, March 24-26 — Contact: Norm De Nardi Enterprises, Los Altos, Calif. (415) 941-8440.

Computers, Freedom and Privacy Conference. Burlingame, Calif., March 25-28 — Contact: CPSR, Palo Alto, Calif. (415)

322-3778.

Fiber Optics Conference. Leningrad, March 25-29 — Contact: Jennifer Kady, Information Gatekeepers, Boston, Mass. (617) 232-3111.

The Software Solution Show and Conference for Manufacturing and Distributing Businesses. Toronto, March 26-27 — Contact: Alwyn Mitchell, Software Matchmakers, Willowdale, Ont. (416) 756-3221.

Quick Response '91. Nashville, March 26-27 — Contact: Quick Response '91, Pittsburgh, Pa. (412) 963-8588.

MARCH 31 - APRIL 6

The Information Systems Security Association Conference. San Diego, April 1-5 — Contact: Richard Rueb, Irvine, Calif. (714) 854-5500.

Network Analysis Users Group Meeting. Vail, Colo., April 1-5 — Contact: Sandy Moretto, NAUG, Menlo Park, Calif. (415) 688-2700.

The Global Economy: Implications for Telecommunications Policy and Management. Los Angeles, April 4-6 — Con-

tact: Matthew Berndt, Center for Telecommunications Management, Los Angeles, Calif. (213) 740-0980.

APRIL 7-13

Focus on Operations XI. Las Vegas, April 7-11 — Contact: Computer Operations Management, Orange, Calif. (714) 997-7966.

IEEE International Conference on Robotics and Automation. Sacramento, Calif., April 7-12 — Contact: Robotics and Automation, Boca Raton, Fla. (407) 483-3037.

Service Trends Conference. San Francisco, April 8-9 — Contact: Lori Larsen, Ledgeway/Dataquest, Lexington, Mass. (617) 862-8500.

Information Security Monogers Symposium. Chicago, April 8-10 — Contact: Pamela Bissett, MIS Training Institute, Framingham, Mass. (508) 879-7999.

Loop Implementation: The Next Steps. Monterey, Calif., April 8-10 — Contact: Electroniccast, San Mateo, Calif. (415) 572-1800.

Turning Audit Costs into Profits: Superstrategies for the Internal Audit Department of the 1990s. San Francisco, April 8-10 — Contact: Pamela Bissett, MIS Training Institute, Framingham, Mass. (508) 879-7999.

Computers and Software for Manufacturing Expo. Chicago, April 8-11 — Contact: Doug Kunz, Cahners Exposition Group, Stamford, Conn. (203) 352-8202.

Notional Design Engineering Conference. Chicago, April 8-11 — Contact: National Design Engineering, Stamford, Conn. (203) 964-0000.

Business Re-engineering Forum. Cambridge, Mass., April 8-12 — Contact: Margaret Murphy, Computer Sciences Corp. Ex-

change, Cambridge, Mass. (617) 499-1227.

The Conference Board Information Management Conference. New York, April 9-10 — Contact: Conference Board Registrar, New York, N.Y. (212) 339-0290.

Seybold Technology Forum. Cambridge, Mass., April 9-11 — Contact: Deborah Hay, Seybold Computing Group, Boston, Mass. (617) 742-5200.

The Software Development Management Conference. San Francisco, April 9-12 — Contact: Software Development Conferences, San Francisco, Calif. (415) 995-2471.

Supercamputer Conference. Newport, R.I., April 9-12 — Contact: John Miguel, Federal Information Processing Council, Middletown, R.I. (401) 841-4591.

Society for Information Management 1991 Institutional Member Conference. Tucson, Ariz., April 10-12 — Contact: SIM, Chicago, Ill. (312) 644-6610.

Unix Challenge 1991. Tyngsboro, Mass., April 10-12 — Contact: Andree Fontaine, Boston University, Corporate Education Center, Tyngsboro, Mass. (508) 649-9731.

Voice '91. Anaheim, Calif., April 10-12 — Contact: Voice '91, Houston, Texas (713) 974-6637.

APRIL 14-20

Congress on CIM Databases. Cambridge, Mass., April 14-17 — Contact: Wilma A. Hurwitz, CAD/CIM Alert, Boston, Mass. (617) 232-8080.

International Technical Communication Conference. New York, April 14-17 — Contact: ITCC, Thornwood, N.Y. (914) 742-5999.

Information User Association: Archiving for the '90s. Salt Lake City, April

14-18 — Contact: IUA Headquarters, Chicago, Ill. (312) 644-6610.

Nastec 3.0. Atlanta, April 14-19 — Contact: Dave Cochrane, National System Programmers Association, Milwaukee, Wis. (414) 423-2420.

Comten Users' Exchange. Baltimore, April 15 — Contact: Ron Block, CUE, New York, N.Y. (212) 633-5080.

Cordtech '91. Crystal City, Va., April 15-17 — Contact: American Electronics Association, Santa Clara, Calif. (408) 987-4256.

Securtech '91. Crystal City, Va., April 15-17 — Contact: American Electronics Association, Santa Clara, Calif. (408) 987-4256.

Wireless Data Networks Conference. Washington, D.C., April 15-17 — Contact: Business Communications Review, Hinsdale, Ill. (800) 227-1234.

Lop & Palmtop '91. New York, April 16-17 — Contact: Peter O'Connor, Laptop Expositions, New York, N.Y., (212) 682-7968.

Dawnizing Conference: Moving from Mainframes to PCs. Boston, April 16-17 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Electro/International. New York, April 16-18 — Contact: Alexes Razeovich, Electro/International, Los Angeles, Calif. (213) 215-3976.

IMSL User Group Europe Conference. Paris, April 17-19 — Contact: Karen G. Mendez (713) 782-6060.

instore Systems: The Key to Better Customer Service. Orlando, Fla., April 17-19 — Contact: National Retail Federation, New York, N.Y. (212) 563-5113.

World Computer Law Congress. Los Angeles, April 18-20 — Contact: Michael D. Scott, Center for Computer/Law, Manhattan Beach, Calif. (213) 689-5186.

RELATIONAL DBMS

Making peace with the past

BY AARON ZORNES

The walls that separate nonrelational and relational database management systems are gradually starting to crumble. Even IBM's rigidly structured IMS database appears to be opening its domain to what some traditionalists have considered to be the anarchist world of Unix and even Apple Computer, Inc. Macintosh relational databases and tools.

Considering the difficulty of migrating legacy databases and nonrelational applications to the relational model as well as the length of time it takes to do so, the ability for the two to interact will be very important.

Applications written for relational databases often need to access either the master mainframe databases or shadow extracts of those databases. Furthermore, data generated by new applications databases often needs to be integrated into existing application systems. In the interim, you'll need the two databases to collaborate.

Squeaky wheels

People are demanding products that go beyond maintaining the databases as separate entities and allow closer interaction. Each type of product differs in its approach, however, and achieves such interaction to a lesser or greater degree.

Most of the major RDBMS vendors are now positioning their gateways as products that can map SQL onto non-SQL databases. This allows programmers to access old databases with the latest SQL-based access tools, such as fourth-generation languages (4GL), graphically oriented query and report writing tools and computer-aided software engineering tools.

The gateway applications access the database, not a dated copy of the database. Extract

Zornes is vice president and director of application development strategies at Meta Group, Inc., a consulting firm in Westport, Conn.



Robert Pizzo

tools, on the other hand, take data from the non-SQL database and dump it into the SQL database (see story page 69). As such, gateways achieve a higher degree of data currency.

The gateway software keeps the entire process transparent to the user or programmer, so there is no need to be concerned with different SQL dialects, error handling, catalog and dictionary conventions or communications protocols.

There are still some problems with gateways, however. Such up-to-date data comes at the expense of performance degradation. In fact, the future popularity of gateways depends on the vendors' ability to increase throughput and lessen impact on operational systems.

Currently, gateways are best used in organizations that need to have current data but have

enough capacity to tolerate the extra processing load. They started appearing as off-the-shelf packages only about one year ago and are still fragile products. Vendors have been implementing them on a one-of-a-kind basis in large firms that can afford a high degree of support.

Stocking up

Implementing DBMS gateways also requires organizations to purchase components such as the DBMS, the gateway and networking software from multiple vendors. The issues that arise include staffing and release coordination between components.

Costs can also run high. DBMS gateways cost from approximately \$1,000 per personal computer up to more than \$100,000 on a midrange system, exclusive of any DBMS licenses.

Computer Associates International, Inc., on the other hand, offers a single-database strategy. The company's emulator product can physically migrate legacy databases such as Cincom Systems, Inc.'s Total, IMS, DL/1 and VSAM into CA's relatively new RDBMSs, CA-IDMS Version 12 and CA-Datcom/DB Version 8. According to CA, existing applications can continue to run unchanged.

The legacy applications are managed by a CA service-layer product that maps the old DBMS data structures and data manipulation routines onto the relational model of CA-IDMS or CA-Datcom/DB. This eliminates duplicate software licenses, negates the processing overhead of keeping both databases in sync, gets rid of duplicate direct-access storage device requirements and eliminates duplicate DBMS expertise.

What you do lose with CA's approach is strong SQL support. CA's SQL is not as robust or as compatible with DB2 as other vendors' implementations. As a result, there is a lack of portable applications development tools supporting CA-IDMS and CA-Datcom/DB databases.

This is a relatively large issue, Continued on page 66

INSIDE

Product Guide

A listing of RDBMSs shipped after January 1990. Page 68.

Another SQL Standard

The next version may not help to clear the confusion. Page 72.

Buyers' Scorecard

Users rate Software AG's Adabas the top RDBMS in survey. Page 74.

Three varieties of coexistence

| PRODUCT | INTERFACE: |
|--|---|
| <ul style="list-style-type: none"> Gateways: <ul style="list-style-type: none"> Apple Computer, Inc. Ask Computer Systems, Inc. DB/Access, Inc.* Digital Equipment Corp. Evolutionary Technologies* Gupta Technologies, Inc. Information Builders, Inc.* Micro Decisionware, Inc. Natural Language, Inc. On-Line Software, Inc. Oracle Systems Corp. Sterling Software, Inc. Sybase, Inc. Emulation products: <ul style="list-style-type: none"> Computer Associates International, Inc. Transparency products: <ul style="list-style-type: none"> Cincom Systems, Inc. | <ul style="list-style-type: none"> Data Access Language Ingres/Star Access/Star, View/PC Decnet DTF Rdbaccess SQL Services Extract Sqlgateway Focus Interfaces PC/SQL-Link NLI Gateway Ramis SQL*Connect Micro/Answer II Open Gateways CA-Datcom/DB Version 8 Escape series CA-IDMS Version 12 Transparency series Supra IMS Coexistence Facility |
| | <ul style="list-style-type: none"> Oracle, RDB, Ingres IMS, DB2, SQL/DS, VSAM, RDB, RMS DB2, VSAM, SQL/DS, RDB VSAM, SAM DB2, VSAM, RDB, Oracle DB2, RMS IMS, IDMS, DB2, Oracle DB2, Oracle All major file and database managers DB2, SQL/DS, Tandem, Teradata Oracle, RDB, Ingres, Informix, Sybase DB2, SQL/DS, IMS, DL/1, CA-IDMS, Adabas, VSAM IMS, DB2, SQL/DS, VSAM DB2, VSAM, CA-IDMS DB2 IMS, VSAM, Total, DL/1 IMS, VSAM, Total IMS, VSAM, Total |

* Extract products that can function as gateways

Source: Meta Group, Inc.

CW Chart: Marie Haines

Continued from page 65 considering that one of the anticipated benefits of coexistence strategies is to leverage all the new tools, such as graphics-oriented query and report writer products that are based on standard SQL application program interfaces.

Cincom takes a similar approach to CA, but unlike CA's products, database migration is unnecessary. With Cincom's Supra database, users can keep their IMS, DL/1 and VSAM data in place and use Supra's full SQL and Mantis 4GL to develop new

relational-based applications against the old data.

As an alternative, developers can also use the language with which they're familiar to develop new databases and applications in the old systems.

With Supra, users can integrate and control data from multiple, heterogeneous data sources from one portable application development environment.

As with CA's coexistence strategy, there will continue to be a lack of third-party application development tools to

Coexistence conditions

Not everyone will want to consider products that facilitate coexistence. They are best used if your next generation of applications needs data that is tied up in the mainframe or minicomputer nonrelational database or if you cannot cost-justify a massive re-engineering of existing applications into a relational environment.

There are cases, however, in which gateways, propagators and migration strategies offered by independent software vendors are not for you. For instance, in all cases, it will probably be difficult to map your nonrelational applications and database into a new, relational one.

You will not want to consider any of these strategies if the following are true:

- The file structures of your older databases are not especially well designed.
- You are unwilling to risk the on-line performance of operational systems.
- You are looking for high-performance, fully distributed databases.

AARON ZORNES

use with Supra because of its SQL dialect.

CA and Cincom offer their products in hopes of migrating customers to their RDBMSs. This is in direct competition with IBM and Digital Equipment Corp.

Both of these companies are, of course, privy to the internals of their DBMSs. As a result, they can provide low-level hooks between nonrelational and relational databases, thereby creating a new class of coexistence facilities known as data propagators or distributors.

IBM's announced Data Propagator (Dprop) is intended to maintain old and new databases as mirror images. Because the two are made into one logical database, IS departments need not dread the conversion of IMS legacy systems.

Dprop updates are propagated either asynchronously or synchronously. With the asynchronous method, transaction files are built when the nonrelational database is being updated and are then used later to update the relational one.

Makes no difference

The benefit here is that there is no impact on the performance of operational or mission-critical systems. The operational system doesn't have to wait for the mirrored system to complete updates.

Synchronous updates work on both databases within the same transaction; that is, two-phase commit is required in each of the target DBMSs. While this provides the maximum level of currency of data, it also slows down and complicates operational procedures for backup, recovery and warm restart.

Some users anticipate disadvantages from Dprop. For instance, transaction performance under IMS may be adversely affected by the wait for two-phase commit to be completed under the DB2 transaction recovery manager. While the

asynchronous method will have minimal operational impact on IMS database performance, the less current data may be less valuable to end users.

Like gateways, the cost of maintaining dual databases should be a major consideration. IBM has announced support only for IMS/DC, the communications portion of IMS, not CICS in the first release.

DEC goes one step further than IBM by providing reverse propagation with its

Emigrants

Most of the RDBMS users surveyed said they plan at some point to move fully to relational, although more than 30% said they intend never to do so

| | |
|-----------------------------|-------|
| Less than 1 year | 8.1% |
| Within 1-2 years | 6.4% |
| Within 2-5 years | 13.2% |
| More than 5 years | 10.2% |
| Already use only relational | 24.3% |
| Never | 31.5% |
| Don't know | 6.3% |

Percent of respondents (Base: 235)

Source: Computerworld survey

CW Chart: Marie Haines

Data Distributor. Data Distributor provides timer- or event-based and user-initiated propagation. For example, extracts of a master price list can be downloaded from IMS, DB2 or VSAM into an RDB database on a VAX system. This can be routed across a Decnet or Systems Network Architecture network to distributed VAX or Unix systems.

Data Distributor can also roll up entire databases or just the logged updates as part of its reverse propagation options. So far, it reverse-propagates only to

Continued on page 69

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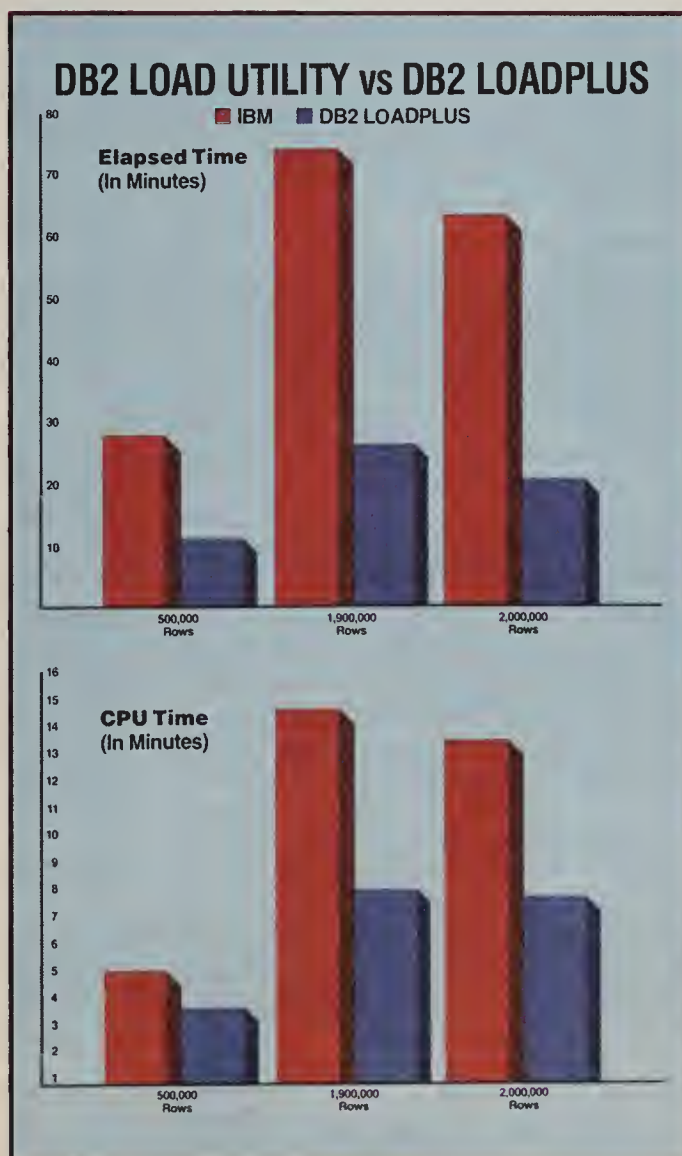
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RDBMSs for mainframe, midrange systems¹

| VENDOR | PRODUCT | HARDWARE REQUIRED | OPERATING SYSTEMS SUPPORTED | IMPORT/EXPORT FILE FORMATS SUPPORTED | TYPE OF SQL | SQL EXTENSIONS INCLUDED | APPLICATION DEVELOPMENT TOOLS INCLUDED | RECOVERY FUNCTIONS | SECURITY FEATURES PROVIDED | ACCESS METHODS USED | NETWORKS SUPPORTED | PRICE | MAINTENANCE FEE ² |
|---|-----------------------------|--|--|---|--------------------------------------|--|---|--|---|---|--|---|---|
| Ask Computer Systems, Inc., Ingres Products Division (415) 769-1400 | Ingres Intelligent RDBMS | Amdahl 5800 series, Bull XPS-100, DG MV, Avion series, DEC (all models), IBM 370 and PCs, Pyramid, Sequent, Tandem, Unisys 5000, 6000, 7000 series | UTS, Unix System V Release 3, AOS/VS, DOS, VMS, Ultrix, Berkeley BSD, AIX, OSX, Dynix | ASCII, binary, DIF, SYLK | Interactive, embedded | Knowledge and object management rules | 4GL, form, menu and report generators | Roll back and forward, transaction logging, Vaxcluster node failure indicator | Limited user access via role and group protection, page locking | B tree, hash, direct, index | NP | \$4,000 - \$450,000 | 15% of license fee |
| Bull HN Information Systems, Inc. (508) 294-5276 | Interel RFM II | Bull DPS 8000 Model 41 through DPS 9000 Model 94 | GCOS 8 | ASCII, DIF, Excel, Lotus' 1-2-3, SYLK, WKS | Interactive, embedded | Teradata TQL extensions | 4GL, form, menu and report generators, CASE tools | Roll back and forward, transaction logging, disk mirroring | Page locking, user views, grant/revoke permission | B tree, index | Bull DSA, SNA, OSI, TCP/IP | \$1,800 - \$6,600 per month | None |
| Cincom Systems, Inc. (513) 662-2300 (800) 543-3010 | Supra | IBM System 370s and PCs, DEC VAX, HP, Pyramid, Sequent, Sun, Sequoia, Fujitsu, Compaq | DOS, VSE/SP, MVS/SP, VM/CMS, AIX, VMS, Ultrix, MSP, FSP, HP-UX, OSX, Dynix, Sun OS, Topix, Interactive SCO | ASCII, binary, EBCDIC | Interactive, embedded SAA, ANSI, DB2 | Referential integrity, domains, autocursor, scroll cursor | Mantis development tools, integration with other vendors CASE tools, project management | Roll back and forward, transaction logging, disk mirroring, dual logging | Row locking, limited user access via multi-level privileges | B tree, hash, direct, index | LAN Manager, LAN Server, Netware | \$1,100 - \$600,000 | 19% of price |
| Cognos, Inc. (617) 229-6600 (800) 426-4667 | Powerhouse Starbase | DEC VAX, HP 3000 and 9000 Series 800/600, DG Avion | DEC VMS, HP MPE XL, HP-UX, DG-UX | ASCII, binary, any that can be read, stored in BLOB data type | Interactive, embedded | Triggers, computed fields, domains, user-defined functions, two-phase commit | 4GL, form, menu and report generators, CASE tools | Roll back and forward, transaction logging, disk mirroring, database shadowing | Record locking, limited user access, group security | B tree, direct sequential scan, heap | TCP/IP, Decnet, HP Advancenet | \$10,000 - \$200,000 | 15% of license fee |
| Computer Associates International, Inc. (516) 227-3300 | CA-Datcom Release 8.0 | IBM Models 9370, 3080, 3090, 3900, System 370, PCs and compatibles | MVS, VSE, VM, DOS | Supercalc, Dbase III and IV | Interactive, embedded | 32-character name, ANSI Cobol record structures, CAISQL | 4GL, form, menu and report generators | Roll back and forward, transaction logging, disk mirroring | Record locking, limited user access | B tree, direct, index | SNA, Netbios | \$96,390 - \$137,500 | 15% of price |
| | CA-DB/VAX Release 1.5 | DEC Microvax 9000 | VMS | ASCII, binary | Interactive, embedded | 32-character name, ANSI Cobol record structures, CAISQL | Menu, report and code generators | Roll back and forward, transaction logging, disk mirroring | Record locking, limited user access | B tree, direct, index | Any VMS- or Unix-based networks | \$5,040 - \$161,280 | 15% of price |
| | CA-IDMS Release 12.0 | IBM Models 9370, 3080, 3090, 3900, System 370, PCs and compatibles; Hitachi, Fujitsu, Siemens mainframes | MVS, VSE, VM, DOS | ASCII, binary, DIF, Excel, Lotus' 1-2-3, SYLK, WKS, Supercalc, Dbase III and IV | Interactive, embedded | 32-character name, ANSI Cobol record structures, CAISQL | 4GL, form, menu and report generators | Roll back and forward, transaction logging, disk mirroring | Record locking, limited user access | B tree, hash, direct, index | SNA, Netbios, TCP/IP | \$73,500 - \$141,800 | 15% of price |
| Concurrent Computer Corp. (201) 758-7518 | Reliance | Concurrent 3200 series | OS/32 | ASCII, DIF | None | None | 4GL, form, menu, report generators | Roll back and forward, transaction logging, disk mirroring | Record locking, limited user access, file and application locking | B tree | OSI | \$6,900 - \$38,870 | 10% of price |
| Data General Corp. (508) 366-8911 (800) 328-2436 | DG/SQL Revision 5.0 | DG MV series | AOS/VS, AOS/VS II | ASCII, binary, DIF, Excel, Lotus' 1-2-3, SYLK, WKS, CEO, DBF | Interactive, embedded, ANSI | Set and cursor functions to fetch, insert, select | Data dictionary, query tool | Roll back and forward, transaction logging, disk mirroring, entity and referential integrity | Record locking, limited user access, read and update at table, column, row levels | B tree, hash, index, clustering, partitioning | Xodiac, TCP/IP, PCI | \$4,070 - \$48,720 for full license; \$1,080 - \$12,945 for runtime license | \$936 - \$2,340 for full license; \$360 - \$936 for runtime license |
| Digital Equipment Corp. (603) 884-2417 | Rdb/VMS Version 4.0 | DEC VAX | VAX/VMS | ASCII, DEC's export format | Interactive, embedded | Some SQL2 features | Precompiler, ISQL, SQL module language | Roll back and forward, transaction logging, disk mirroring, Vaxcluster support | Record locking, limited user access via grant/revoke privileges and VMS access control lists | B tree, hash, direct | Decnet | \$3,680 - \$236,600 for development license | \$120 - \$6,684 |
| IBM (800) 426-2468 Contact local IBM sales office | SQL/400 Release 3 | IBM AS/400 | OS/400 Release 3 | ASCII, DIF, SYLK, DOS Random, BASIC Sequential and Random | Interactive, embedded | Prompting support, on-line Help, access to and from native applications, dynamic SQL functions, group security | None | Roll back and forward, transaction logging, disk mirroring, point-in-time recovery, save/restore single objects, back out, multiple isolation levels | Record locking, limited user access to field, view, record, library, object-level locking, storage protection | Direct, index | VTAM, SNA | \$1,575 - \$11,020 | None |
| | SQL/DS Version 3.1 | IBM Enterprise System/9000, System 370 | VM, VSE | Binary | Interactive, embedded | Referential integrity, dynamic SQL functions | None | Roll back and forward, transaction logging, audit trails | Record locking, limited user access | B tree, direct, index, direct scan | VTAM, SNA | \$364 - \$4,810 monthly license fee | None |
| Informix Software, Inc. (415) 926-6300 | Informix-Online Version 4.0 | DEC VAX, Pyramid, AT&T 3B series, HP 9000, Sequent Symmetry, DG Avion | Ultrix, DG-UX, Unix System V | ASCII, binary | Interactive, embedded | Matches, unique keyboard, into temporary tables | None | Roll back and forward, transaction logging, disk mirroring, archive, restore | Record locking, grant/revoke permissions | B tree | TCP/IP, Stargroup | \$5,000 - \$168,000 | \$900 - \$30,240 |
| | Informix-SE Version 4.0 | Same as above | Unix System V, DOS Xenix, Ultrix, DG-UX | ASCII | Interactive, embedded | Matches, unique keyboard, into temporary tables | None | Roll back and forward, transaction logging | Record locking, grant/revoke permissions | B tree | TCP/IP, Stargroup | \$2,500 - \$142,000 | \$450 - \$25,700 |
| Interbase Software Corp. (617) 275-3222 | Interbase Version 3.0 | DEC VAX, HP 9000, DG Avion, Sun, Silicon Graphics | Sun OS, Domain, VMS, Ultrix, HP-UX, IPIX, AIX 3.3 | ASCII, DIF, Rdb, Starbase | Interactive, embedded | Dynamic SQL functions, triggers, some ANSI SQL2 features, GDML proprietary language | 4GL, form, menu and report generators | Roll back, disk mirroring and shadowing, multigeneration record structures, recovery | Record locking, limited user access via grant/revoke permissions | Direct | TCP/IP, Decnet, Apollo Mailbox | \$5,000 - \$200,000 | 12% |
| Microsystems Engineering Corp. (708) 882-0111 | Mass-II Manager Version 9.0 | DEC VAX | VAX/VMS 4.2 and higher | ASCII | None | None | Form and report generators, proprietary command language | Maintain backup files | Limited user access | Direct | None | \$1,000 - \$21,000 | 15% of price; first 6 months free |
| Must Software International (203) 845-5000 (800) 441-6878 | Nomad 3.0 for VAX/VMS | DEC VAX, Microvax, Vaxstation | VMS 5.1 and higher | DIF, Lotus' 1-2-3, Dbase, Nomad | ANSI | Some ANSI SQL2 features, procedural language, outer joins | 4GL, form, report, schema and maintenance code generators, procedural language | Roll back | Record locking, limited user access | Index | Digital Pathworks, Decnet, TCP/IP, Netbios | \$3,000 - \$125,600 | 12% - 18% of price; first year free |
| Oracle Systems Corp. (415) 506-7000 (800) 345-3267 | Oracle Version 6.0 | Stratus XA2000, Prime 50 series | VOS, Primos | ASCII | Interactive, embedded | Some SQL2 functions | 4GL, form, menu and report generators, CASE tools | Roll back and forward, transaction logging, disk mirroring | Record locking, limited user access | B tree, index | Stratalink, Stratanet, TCP/IP, Primenet | \$7,700 + for Stratus version; \$11,000 + for Prime version | 15% of license fee |

¹All products listed started shipping after January 1990. ²All maintenance fees are per year unless otherwise noted.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

| VENDOR | PRODUCT | HARDWARE REQUIRED | OPERATING SYSTEMS SUPPORTED | IMPORT/EXPORT FILE FORMATS SUPPORTED | TYPE OF SQL | SQL EXTENSIONS INCLUDED | APPLICATION DEVELOPMENT TOOLS INCLUDED | RECOVERY FUNCTIONS | SECURITY FEATURES PROVIDED | ACCESS METHODS USED | NETWORKS SUPPORTED | PRICE | MAINTENANCE FEE ² |
|---|--------------------------------|--|--|---|-----------------------------|--|--|---|--|---|---|--|--|
| Progress Software Corp. (617) 275-4500 | Progress 4GL/RDBMS Release 6.0 | AT&T 3B2, Decsystem, IBM PCs and compatibles | A/UX, Unix System V, Ultrix, DOS, VAX/VMS, CTOS/BTOS, OS/2, Xenix, AIX | ASCII, DIF, Excel, Lotus' 1-2-3, SYLK, Uniplex, Multiplan, 20/20, Wordperfect, Wordstar, Microsoft Word, BTOS Ofis Writer | Interactive, embedded | Progress 4GL extensions | 4GL, form, menu, report and QBF generators | Roll back and forward | Record locking, limited user access at database, file and field levels | B tree | Netbios, Decnet, SPX/IPX, TCP/IP | \$1,500 - \$220,000 | 15% of price |
| Recital Corp. (508) 750-1066 | Recital | DEC VAX, NCR, Sun, IBM, HP, DG | VMS, Ultrix, Unix System V, Release 3.2, SCO Unix, Xenix | ASCII, binary, DIF, Excel, Lotus' 1-2-3, SYLK, WKS | Interactive, embedded | Triggers, ANSI extensions, dynamic SQL functions | 4GL, form, menu and report generators | Journaling before and after image | Limited user access via permissions for time, location, file, column, table levels | B tree, hash, direct, index | Decnet, TCP/IP, NFS | \$5,625 - \$87,500 for VAX version; \$995 for single-user Unix version to \$9,380 for 16-user Unix version | First year free; then 15% of price for VAX or Unix version |
| Sharebase Corp. (408) 378-7000 | Server/8000 Model 250 | Sharebase Server/8000 | DOS, Sun OS, VAX/VMS, Unix, Ultrix, MVS, VM/CMS, OSX | ASCII, DIF, Excel, Lotus' 1-2-3, SYLK | Interactive, embedded, ANSI | Compiled commands, dynamic SQL functions, date/time, referential integrity | 4GL, form, menu and report generators | Roll back and forward, transaction logging, disk mirroring | Limited user access via passwords, permissions to column level | B tree, index | 3Com, Netware, Decnet, TCP/IP, RS232 | \$165,000 for hardware and software | 10% of price |
| Sterling Software, Inc., International/AD Labs Division (613) 727-1397 | ZIM Release 3.11 for Avion | DG Avion and Model 88 | DG UX, 88 Open | ASCII | Interactive | Some SQL2 features | 4GL, form, menu and report generators | Roll back and forward, transaction logging | Record locking, limited user access via passwords, field level security | B tree | NFS | \$1,725 + | \$305 + |
| Sybase, Inc. (415) 596-3500 | Sybase Release 4.0 | DEC VAX, HP 9000, AT&T Starserver, Sequent, Pyramid Mserver, DG Avion | VMS, Unix, VOS, OS/2 | ASCII, binary, Lotus' 1-2-3 | Interactive, embedded ANSI | Stored procedures, triggers | 4GL, form, menu, application and report generators | Roll back and forward, transaction logging, disk mirroring | Limited user access | B tree, clustered index | None | \$3,750 - \$250,000 | 10% - 15% of license fee |
| Tandem Computers, Inc. (408) 285-6000 | Non-Stop SQL | Tandem Non-Stop machines | Guardian | ASCII, binary, DIF, Excel, Lotus' 1-2-3, SYLK, WKS, DDE, EBCDIC, RBS, RPT, WKI | Interactive, embedded | OLTP optimizations, parallel queries, dynamic SQL functions | 4GL, form, menu and report generators, CASE tools | Roll back and forward, transaction logging, disk mirroring, fault tolerance | Record locking, limited user access, integrated systems security | B tree, direct, hash, index, sequential block | OSI, SNA, TCP/IP, LAN Manager, Netware, 3Com, Starlan | \$1,495 + | \$265 + |
| Unidata, Inc. (303) 756-0897 | Unidata RDBMS Release 2.0 | DEC Ultrix- and VMS-based machines, IBM RS/6000, Tandem Integrity S2, DG Avion, Pyramid, Sun, HP | VMS, Unix | ASCII, binary, user-defined formats | Interactive, embedded | ANSI extensions | 4GL, form, menu and report generators | Transaction logging; disk mirroring (on VMS only) | Record and table locking, field-level security | B tree, hash, index | TCP/IP | \$599 - \$210,000 | 15% of price |
| Unisys Corp. (215) 986-3501 | RDMS1100 | Unisys 1100, 2200 series | OS1100 | None | Interactive, embedded | Area management, triggers | 4GL, report generator | Roll back, transaction logging, disk mirroring, auto recovery, message recovery | Record locking, limited user access | B tree, hash, direct, index | Oracle Sqlnet | \$43,054 - \$110,032 for five-year license | Included in price |

Extractors take the wheelbarrow approach

The quickest, dirtiest and oldest method of maintaining two databases is via extract products.

Extract products are like wheelbarrows, pulling production data from operational databases on a periodic basis and then reloading the data into a relational database. An example is IBM's DXT product, which extracts databases from IMS and VSAM into DB2 and SQL/DS.

With extract products, updates to the decision support system (DSS) databases are not

usually rolled back up into the operational databases. Because the data is only as current as the last extract, this method is best used for DSSs, which do not require highly current data. SQL databases are also well-suited for ad hoc querying, reporting and analysis.

The cost of maintaining shadow databases may appear high because they require duplicate disk storage, plus duplicate or additional software licenses for the second database. Extract

software typically costs \$10,000 to \$20,000 per database interface.

In addition, DSS applications can be very expensive in terms of operational resources.

Nevertheless, this method does not require any differentiation in who accesses the database, sidestepping organizational politics.

The extract method has been successfully marketed by IBM in its Information Center efforts, as well as by independent software vendors such as Information Builders, Inc. and Must Software International, Inc., whose DSS-oriented fourth-generation language products fit nicely into this architecture. •

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Continued from page 66

DEC-supplied data managers.

Aside from this propagator, DEC has gone to considerable effort to line up products for coexistence strategies with both IBM and third-party databases with extract facilities and gateways.

The Rdbaccess family of gateways provides on-line access to DB2 and Oracle Systems Corp. databases. When used with its extract product Vaxlink, it can tap into almost any mainframe

data source.

DEC remarkets the Sterling IMS and VSAM gateways, while Sterling markets gateways to databases such as Total and CA-Datcom/DB.

Vaxlink is primarily an extract facility; however, the extracts go into an RDB database, which allows the DEC Data Distributor to propagate the extract through the environments.

Although its Ddrop has invoked a lot of interest, IBM is

not alone in recognizing the market requirements for coexistence with legacy systems. Independent software vendors have had such strategies and products in place for years.

By 1993, when DBMS vendors work out kinks in their gateways and products mature, coexistence products will become strategic for IBM, DEC and key independents to assist users in migrating and converting legacy databases and applications. •

Everything's relational

As most information systems professionals know by now, the relational model is the most popular form of database management system. Users are gradually migrating toward relational standards, especially SQL, which is used by many products to access the database.

However, the debate rages on about what is relational and what is not.

The discussion is fueled by vendors that try to modify their nonrelational systems to look and act more relational and by purists who insist on relational guru E. F. Codd's 12 rules for relational DBMSs [CW, Oct. 14, 1985] as the only definition.

For practical purposes, the definition of relational is less important than the behavior of a given database. If a system is labeled relational, it creates certain expectations for the user — SQL conformance among them.

According to Colin White, president of Database Associates, a consulting firm in Morgan Hill, Calif., there are three key aspects to Codd's model that should be reflected in any RDBMS:

- **Language.** Not only should SQL be fully supported as the database query, administration and programming language, but the physical file structure of the database should also be optimized for SQL.

- **Structure.** Data must be organized as values in tables at the logical level. Data elements should be logically accessible through the use of a primary key. Null values representing missing or inapplicable information should be explicitly supported.

- **Integrity support.** Data integrity must be built into the database and into its access languages, rather than into the applications.

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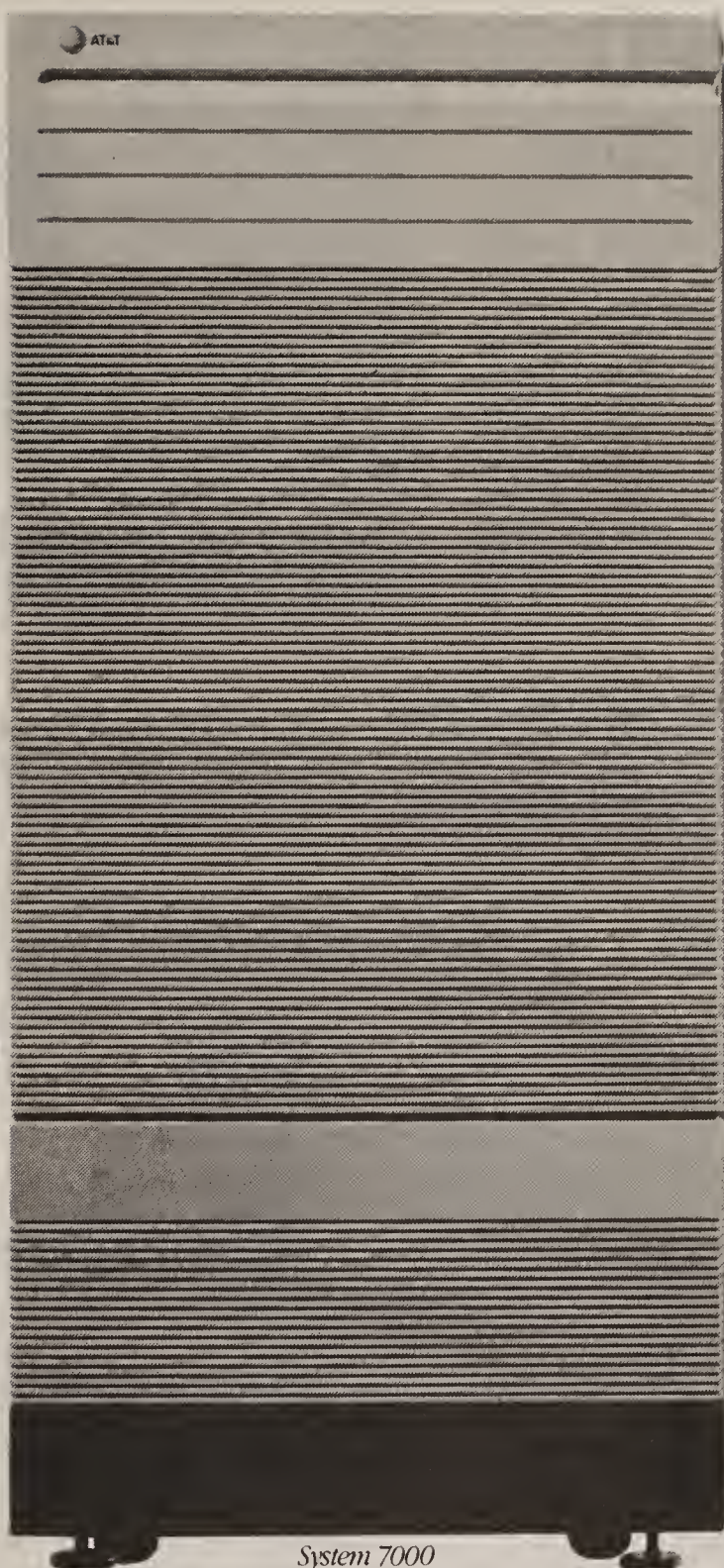
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|---|--------------------------------------|-------------------------------|------------------------|-----------------------------|
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| TPS (Oracle TP1 benchmark) ¹ | 208 + | 151 | N/A | 205 + |
| Max Memory | 512 MB | 512 MB | 768 MB | 384 MB |
| TPS (Informix® TP1 benchmark) | 201 | N/A | N/A | 175 ¹ |
| CPU Performance Range | 14-168 MIPs | 13-72 VUPs | 53-100 MIPs | 10-150 MIPs |
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Computer Systems

The next standard for SQL and what it will mean to you

BY ALLEN G. TAYLOR

If you thought SQL-89, the last ANSI standard for SQL, was complex, you haven't seen SQL2.

From the preliminary drafts, it is clear that SQL2 — the informal name for the next SQL standard that has been formulated but not officially adopted — will be

Taylor is a seminar speaker, writer and systems consultant in Westminster, Calif.

big and extremely complex. Database vendors have access to this draft, but no one is anywhere near compliance with it.

If vendors did fully comply with one standard or another, SQL could serve as a common language for accessing all data in all databases, whether it resided on a mainframe, personal computer or minicomputer. This would do wonders to forward the trend of computing in heterogeneous environments in which different computers running different operating

systems and applications need to share data.

As it stands, not even vendors claiming full compliance with SQL-89 necessarily offer compatible products.

They may comply with the 100 pages of rules that address the basic, core capabilities of SQL, but they've also found it necessary to add proprietary extensions that go beyond the facilities defined in the ANSI standard to produce a hopefully richer language.

As a result, major incompatibilities exist among the different vendors' products, even though they may all claim to be SQL-

89-compliant.

SQL2 is an attempt to overcome the limitations of the earlier standard. The work that the American National Standards Institute (ANSI) and the International Standards Organization began in 1987 to develop a richer standard has produced more than 700 pages of documentation, broken into two parts.

The first part is SQL2.

It consists of those features that the committee thought could be implemented within a few years. The second part, SQL3, includes facilities that will be harder to implement.

When SQL2 is finally approved, it will be formally named SQL-92 or SQL-93, depending on which is appropriate.

Now, however, because the new standard has so many rules to comply with, the stakes of full compliance have been



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IF VENDORS DID fully comply with one standard or another, SQL could serve as a common language for accessing all data in all databases, whether it resided on a mainframe, personal computer or minicomputer.

raised even higher. Many moons will pass before any vendor offers all the features specified in the standard.

Moreover, SQL2 will offer three levels of compliance — entry, intermediate and full — just as SQL-89 offered two levels. The entry level is only a small step beyond SQL-89, consisting mainly of bug fixes, according to Colin White, president of Database Associates in Morgan Hill, Calif. Intermediate is the level most users need, and the full level contains additional functions that only a few users will need.

This raises a couple of issues for buyers. The many levels of compliance — not to mention the many different SQL "standards" — are a prescription for confusion. When vendors claim to be ANSI SQL-compliant, it will be difficult, if not impossible, to know what they mean.

Furthermore, even if two products comply with the same level of the same standard, it is unlikely that they will be compatible with each other. Extensive as the SQL2 standard is, vendors will continue to incorporate nonstandard extensions into their products.

At best, SQL2 will serve as a guide. If a vendor is going to incorporate a new feature into its product, it will probably do it the SQL2 way rather than inventing its own. However, if a desired feature is not addressed by SQL2, most vendors will add their own version instead of waiting for a new standard to emerge.

Buyers truly interested in using SQL to access data across platforms should make sure that all used versions of SQL comply with the same standard at the same level.

Beyond that, they should use only ANSI-standard features in their application code. Nonstandard vendor extensions, no matter how helpful they might be, will almost certainly not work on more than one platform. •

How vendors have and have not met criticism

BY ALLEN G. TAYLOR

Poor performance. Difficult to use. Impossible to tune. Since IBM released DB2 and relational databases were unleashed in the world, people have voiced these and other complaints about relational database management systems.

Although some of these criticisms still apply, they do not appear to have caused much permanent damage to the popularity of relational technology.

According to a *Computerworld* survey of 235 users of RDBMSs, 57% installed their first version more than three years ago, and 81% started right in with production rather than test applications.

Here's what vendors have and have not done to meet user criticism:

• **Criticism No. 1: Too slow.** One of the first criticisms of relational database technology was that it was slow. In recent years, improvements in performance have been substantial, and industry experts envision further improvements.

"Performance is at an acceptable level for perhaps 80% to 90% of companies that use mainframes," says William Backs, president of the International DB2 Users Group and a senior consultant at CSC Partners in Oak Brook, Ill.

However, he adds, there are still many things that could be done to improve performance even further.

The 10% to 20% of companies that may still have a performance problem are typically Fortune 100 companies running the world's largest business applications, Backs says.

• **Criticism No. 2: Hard to tune.** Sometimes poor performance is symptomatic of a poorly tuned system. This may often be the case because relational databases are infamous for being difficult to tune.

Some relational products have added tremendously to tuning flexibility; unfortunately, however, such added capability seems to go hand in hand with complexity.

For example, according to Dave Kellogg, director of server product marketing at the Ingres Division of Ask Computer Systems, Inc., "Ingres . . . has more dials and knobs than most people know what to do with."

He adds, "Paradoxically, extensive tuning capability can make it hard to tune a system."

The solution Ingres offers is to hold classes for users, although Kellogg says the company is looking into tools that would make tuning easier.

The design and maintenance of relational systems is inherently complex, says Dave McGoveran, principal at Alternative Technologies in Santa Cruz, Calif.

Extensive training, according to McGoveran, is currently the only way to ensure the production of efficient applications.

• **Criticism No. 3: Hard to use.** Although some contest it, complaints about complexity extend into Structured Query Language (SQL), the query language used to manipulate data in a relational database.

Vendors have addressed the problem by shielding users from SQL with query builders and other tools that generate SQL code.

Because the user interfaces only with the tool, he may never see the SQL code the tool generates.

Information Builders, Inc.'s Focus falls into this category, as does Oracle Systems Corp.'s SQL*Forms.

Although some applications will always have to be implemented at least partially with SQL, the goal of tools vendors is to reduce that as much as possible.

The more the development process can be automated, the quicker applications can be built and debugged.

• **Criticism No. 4: Unreliable.** Original relational products were also pegged as deficient in enforcing basic integrity constraints.

However, says Herbert A. Edelstein, a principal at Euclid Associates in Potomac,

Md., current products do a good job of ensuring data integrity.

A number of products abide by the ANSI SQL-89 specification (see story page 72), which calls for referential integrity. These products include IBM's DB2 and SQL/DS; Cincom Systems, Inc.'s Supra; Computer Associates International, Inc.'s CA-Datcom and CA-IDMS; Digital Equipment Corp.'s RDB; and Ask's Ingres.

• **Criticism No. 5: No arrays.** Some problems arise because of the relational model itself. For instance, strict adherence to the relational model does not allow the inclusion of arrays, or repeating

groups, in a database.

Each row in a database table must contain no more than one data item per column. Arrays of numbers are strictly forbidden because they violate the first normal form of a relational database.

However, there is general agreement — even among people who might be classified as relational purists — that array processing can be valuable in some applications.

Most vendors either already support repeating groups or have committed to supporting them in the future.

Unidata, Inc. in Denver, claims to offer the first commercial implementation of the nonfirst normal form data model.

Both CA-Datcom and CA-IDMS support repeating groups. •



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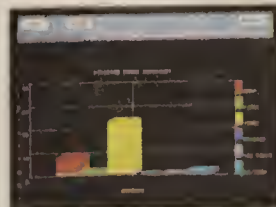
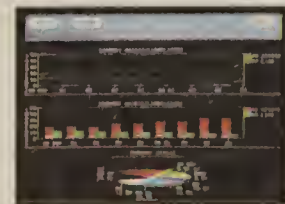
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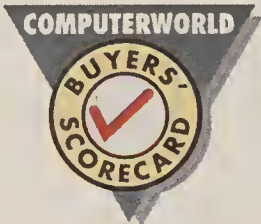
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BUYERS' SCORECARD

Users rate Adabas function over relational form

|  Mainframe RDBMSs <i>Scores reflect user ratings on all criteria and their user-assigned importance</i> <i>Response base: 40 per product set, except Datacom (20) and IDMS (16)</i> | | |
|---|--|--|
| Product | Two highest ratings | Two lowest ratings |
| Software AG's Adabas SCORE 51 | Availability and crash recovery On-line transaction performance | SQL extensions System security integration |
| Oracle's Oracle SCORE 49 | Support for standard SQL SQL extensions | Performance and system monitors Integration of CASE tools |
| CA's Datacom SCORE 48 | Availability and crash recovery On-line transaction performance | Integration of CASE tools Distributed updating, remote features |
| IBM's DB2 SCORE 47 | Availability and crash recovery Support for standard SQL | Integration of CASE tools Programming tools |
| Cincom's Supra SCORE 46 | Availability and crash recovery On-line transaction performance | Distributed updating, remote features Support for standard SQL |
| CA's IDMS SCORE 45 | Availability and crash recovery On-line transaction performance | SQL extensions Integration of CASE tools |
| IBM's SQL/DS SCORE 45 | Support from standard SQL Effective user-defined integrity | Integration of CASE tools Performance and system monitors |

BY MICHAEL L. SULLIVAN-TRAINOR
CW STAFF

Although some consider it a far cry from the standard model of relational database management systems, Software AG of North America, Inc.'s Adabas is proving itself in the field. The product topped *Computerworld's* Buyers' Scorecard on mainframe RDBMSs by scoring highest in eight of 15 categories.

Adabas users rated their product highest in systems availability and recovery from crashes — by far the most important category for all users surveyed. In addition, the product received the top rating for providing effective programming tools.

Rather than integrating relational functionality within Adabas, the current version of the product in the field provides relational capabilities by using a SQL access layer above the database engine.

More than 235 users of mainframe RDBMSs rated their products on a one-to-10 scale across the categories. Each user group rated only its own products.

Forty responses were included for each of the products, with the exception of Computer Associates International, Inc.'s Datacom (20 responses) and IDMS (16 responses), both of which are new to the market with relational features (see methodology next page).

Coming in with the second highest ratings from its users was Oracle Systems Corp.'s Oracle, which is more firmly built on a relational and SQL cornerstone.

This attribute is reflected in its top rating in the useful SQL extensions category. The product also scored second

highest in decision support applications performance, integration of the operating system and RDBMS security and integration of computer-aided software engineering tools.

Datacom and IDMS have long histories as leading nonrelational DBMSs but with the latest versions, CA has moved them into the relational league. They have been rebuilt as hybrids with relational and nonrelational attributes.

Datacom scored the highest user rating in performance of on-line transaction, the second most important user category. The product also topped the end-user tools category.

The relational version of IDMS, which is still in beta testing, rated highest in providing performance and system monitors but generally did not fare as well as Datacom. For example, it received the lowest score in providing effective end-user tools.

IBM's DB2, the most popular RDBMS on IBM and compatible mainframes, scored a fourth-place position. DB2 never rose to the top of the pack in terms of user ratings, but it scored two second-place positions for useful SQL extensions and support for standard SQL.

DB2's counterpart, SQL/DS, fared even worse, tying with IDMS for last place. But SQL/DS did achieve the highest rating in support of standard SQL. A last-place rating in system availability and recovery from crashes didn't help the product's positioning.

Finally, Cincom Systems, Inc.'s Supra topped another key relational category: providing effective user-defined integrity. However, the rating was outweighed by last-place finishes in decision support performance, distributed updating, support for standard SQL and useful SQL extensions. •

KEY RATINGS

Adabas achieved the highest rating in the category most important to users: system availability and crash recovery. Datacom received two top ratings. Despite low ratings overall, Supra and IDMS each captured firsts in key areas

User importance rating:

9.2 System availability and recovery from crashes

| | |
|---------|-----|
| Adabas | 8.7 |
| Supra | 8.5 |
| Datacom | 8.3 |
| DB2 | 8.3 |
| IDMS | 8.1 |
| Oracle | 7.9 |
| SQL/DS | 7.3 |

8.5 Performance in processing on-line transactions

| | |
|---------|-----|
| Datacom | 8.2 |
| Adabas | 8.1 |
| Supra | 7.7 |
| IDMS | 7.5 |
| DB2 | 6.8 |
| SQL/DS | 6.5 |
| Oracle | 6.3 |

7.8 Providing effective user-defined integrity

| | |
|---------|-----|
| Supra | 7.8 |
| Adabas | 7.7 |
| SQL/DS | 7.5 |
| DB2 | 7.3 |
| IDMS | 7.2 |
| Datacom | 7.0 |
| Oracle | 6.9 |

7.8 Providing effective programming tools

| | |
|---------|-----|
| Adabas | 8.1 |
| Supra | 7.2 |
| Datacom | 7.2 |
| Oracle | 7.0 |
| IDMS | 6.9 |
| SQL/DS | 6.4 |
| DB2 | 5.8 |

7.3 Performance and system monitors

| | |
|---------|-----|
| IDMS | 6.8 |
| Adabas | 6.6 |
| Datacom | 6.6 |
| Oracle | 6.1 |
| Supra | 6.0 |
| DB2 | 5.8 |
| SQL/DS | 4.9 |

7.3 Providing effective end-user tools

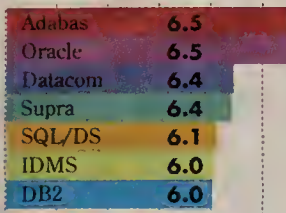
| | |
|---------|-----|
| Datacom | 6.9 |
| Adabas | 6.8 |
| Oracle | 6.6 |
| Supra | 6.2 |
| DB2 | 6.2 |
| SQL/DS | 6.0 |
| IDMS | 5.4 |

A CLOSER LOOK

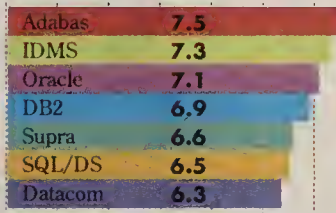
Adabas users rated it highest in six out of nine remaining categories. Oracle achieved the highest ratings for auditing functions and useful SQL extensions. Although a low scorer overall, SQL/DS edged ahead of DB2 in user ratings of support for standard SQL.

User importance rating:

7.1 Integration of DBMS and operating system security



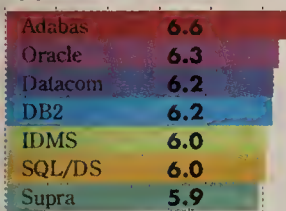
7.1 Multilevel security features



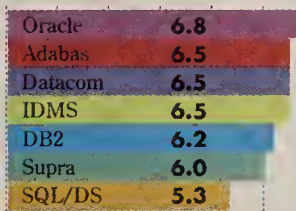
7.0 Support of standard SQL



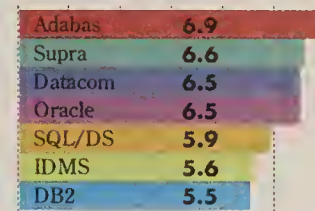
6.7 Performance in decision-support applications



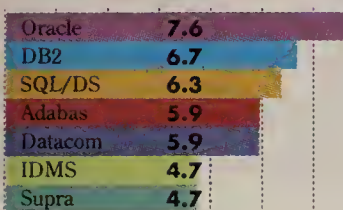
6.7 Auditing functions



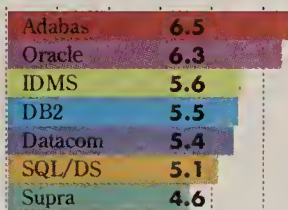
6.4 Ease of migration from nonrelational DBMSs



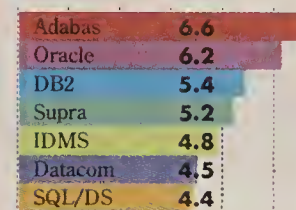
6.3 Useful SQL extensions



6.2 Distributed updating, recovery and remote administration



5.8 Integration of CASE tools

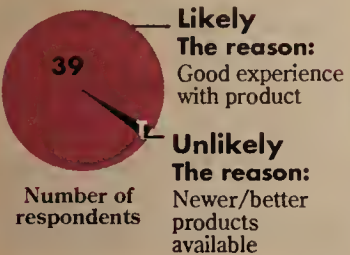


Loyalties

How likely would you be to purchase this product again if you were making the decision today?
(Reasons based on most frequently stated responses)

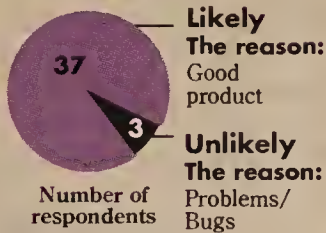
Adabas

Response base: 40



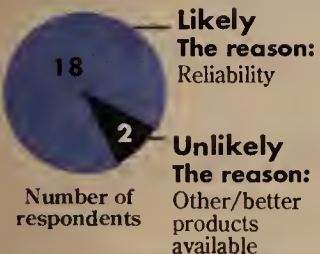
Oracle

Response base: 40



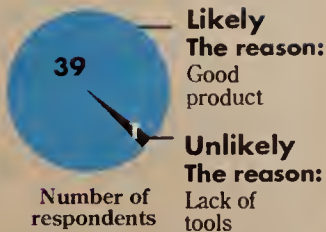
Datacom

Response base: 20



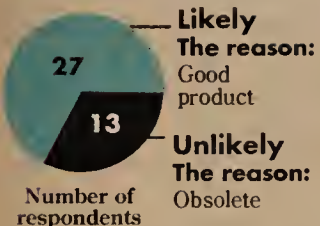
DB2

Response base: 40



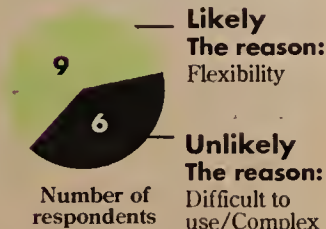
Supra

Response base: 40



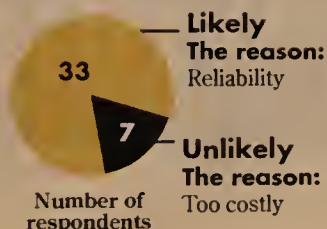
IDMS

Response base: 15



SQL/DS

Response base: 40



Verbatim

What do you like best/least about this product?

(Responses are based on the most frequently stated answers)

Adabas

Likes

Ease of use
Flexibility

Dislikes

Slow
Security features

Oracle

Likes

Runs on multiple platforms
Flexibility

Dislikes

Price
Lack of support

Datacom

Likes

Performance
Data dictionary

Dislikes

Integrity features
Outdated

DB2

Likes

Ease of use
Relational capability

Dislikes

Security features
Resource consumption

Supra

Likes

Ease of use
Performance

Dislikes

Lack of SQL features
Lack of service/support

IDMS

Likes

Recovery capabilities
Good tools

Dislikes

Documentation
Updating between test and production

SQL/DS

Likes

Ease of use for programming
Flexibility

Dislikes

Not user-friendly
Performance problems

Vital statistics

Total number of respondents: 235

What is your position?

Database administrator . 125
IS manager 110

For how many years have you been involved with RDBMSs?

5 or more years 137
3 to 4 years 67
1 to 2 years 28
less than 1 year 3

METHODOLOGY

To qualify for *Computerworld's* Buyers' Scorecard on mainframe relational database management systems, a product had to run on an IBM or compatible mainframe, be one of the market leading databases on those platforms and support relational features, including SQL.

Forty responses were collected for each product type, with the exception of Computer Associates International, Inc.'s Datacom and IDMS. Minimum responses were reduced to 20 and 16, respectively, for these two groups because although the nonrelational versions have large installed bases, the relational versions are new to the market, and IDMS is still in beta testing.

The survey was conducted by First Market Research Corp. in Austin, Texas, an independent telephone research firm. Results were tabulated with the assistance of IDG Research Corp. Random lists of users were obtained from objective nonvendor sources as well as from vendors.

The total weighted scores were computed by multiplying the mean scores users assigned to the importance of each criterion by the mean scores each user group gave its own products. Ratings are presented in order of importance to all users based on these mean importance ratings.

ACKNOWLEDGEMENTS

Computerworld would like to acknowledge assistance provided by the following individuals and companies: Computer Intelligence; Installed Technology International; Richard Finkelstein, Database Associates; David McGovern, Alternative Technologies, Inc.; Colin White, publisher of *InfoDB* and *Database Review*.



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Wa\$te not, want not

*Reaping benefits from information technology begins
by knowing where your money is going*

BY PETER G. W. KEEN

For each of the past three decades, information technology (IT) budgets — for hardware, software and telecommunications — have grown at about 15% per year, which is far greater than the rate of business growth. It will be impossible to sustain this rate in the 1990s.

A growing number of senior executives are worried that IT costs may be out of control.

IT now amounts to about half the incremental investment for large firms. It has become a contender for scarce business capital and not just for tomorrow's expense budget. There is little evidence that the investment is producing adequate benefits. What is more, there are no reliable methods for measuring the business value of IT.

Senior executives are caught in a worrisome double bind: Economically, companies cannot afford to increase capital spending on IT; competitively, they cannot afford not to do so. The economics of information capital is firmly on the top management agenda, and corporate managers are clamoring for help.

Counting all costs

Many companies do not know what they are spending on IT. End-user computing and telecommunications expenditures are scattered across business units' budgets, and many organizational costs are not even tracked.

How can firms make rational decisions about IT when they do not know its true costs? The starting point for managing the economics of information capital is to understand that IT costs are of two types: supplier costs (the costs incurred by the information services function) and user costs (the growing portion of firms' total IT expenditures that is being shifted out of central corporate information systems units in the business).

Supplier costs. Corporate IS groups are a form of internal supplier, analogous to a utility. They operate corporate data centers and telecommunications facilities and provide services such as systems development

Keen is founder and executive director of the International Center for Information Technologies, a research organization in Washington, D.C.



Debbie Palen

and information management. Their costs are charged back to the business users.

Computer hardware and operating systems and telecommunications equipment comprise the power plant for information services. Frequent changes in the components of this power plant, driven by rapid technological change, require continual retraining of the people who operate and maintain it.

An increasing proportion of the operations function is committed to ensuring the reliability, security and availability of key business services that depend on the IT

base. When an airline's reservations system is down, so, too, is its business. Operations skills and resources are essential to the on-line business enterprise and are a vital element in the technical infrastructure. They are also not cheap.

The business services delivered via IT hardware are realized in applications systems. Development — and subsequent operation and maintenance — of these systems is also people-dependent. Whereas systems development costs are discretionary, operations and maintenance costs are not. Inasmuch as maintenance can amount to one to three times the development cost, today's development budget sets the IT budget for the next several years.

For every dollar of initial development expenditure for a large system, operations costs will average 20 cents per year and maintenance 40 cents per year. At any given time, only about 10% of a corporate information services unit's staff is developing new systems; maintenance occupies 50% or more of its scarce human resources.

The cost of support is growing rapidly as IS groups shift from building systems to supporting business units. The support facilities for a \$5,000 personal computer, for example, typically amount to at least \$8,000 per year, according to research organization Gartner Group, Inc. Much of that will be paid for by the business unit, but it is a new burden on IS units.

On the supplier side, only new development is truly a variable cost.

User costs. User costs vary widely, depending on company policy regarding IS cost allocation and recovery. Some of these costs, being hidden, are unbudgeted.

Allocations and chargeback of central IS unit/supplier costs obviously become user costs. To these are added direct acquisition and usage costs. PCs are a frequent element of the former. Direct usage costs, which largely depend on transaction volumes, can grow rapidly and be hard to control.

For example, a single PC accessing an outside information service may not need

Continued on page 78

- Counting all costs, including hidden ones
- A technology balance sheet you can use
- Infrastructures are an economic drain

Continued from page 77

special justification or budgeting. But with IT, supply often creates demand.

There is an obvious and immense difference between initial small-scale, ad hoc computer use and wider departmental capability. To manage such investment case by case (piecemeal) is to likely overlook how a series of \$5,000 PC purchases can become a million dollar capital plan just for hardware acquisition. The hidden costs of support and telecommunications can dwarf this expenditure.

Central IS units have long struggled to manage compounded costs driven by software development. Business units now face similar stresses. With the advent of PCs, distributed development, office technology, departmental operations and end-user computing, these units began to incur many of the costs of distributed information management previously borne by the central information services group.

Perspectives on costs

Business units often do not see the scale or value of central IS infrastructures. They do see the money they are charged for these resources, whether directly for usage or through an allocation for their part of the shared base. Similarly, many business unit managers view as an expense, rather than as an essential service asset, the legions of IS staff members who develop the software and information management asset that is so critical to competitive positioning and a basic element of efficient business operations.

For their part, IS managers have no ready formula for allocating infrastructure costs fairly. Consider this representative sample of the questions they face:

- Should the first users of a telecommunications service carry the full burden, even though the marginal cost is low?
- Who should pay for the development of a customer master database, an infinitely reusable resource that will eventually be of value to many business units?
- Where outside services are cheaper, should business units be allowed to use them and thereby reduce the customer base for the shared corporate resource?

Senior management, if it takes any notice at all, is not likely to be helpful. Top management response to the fixed-cost nature of supplier costs is usually to demand that IS budgets be cut.

| An information technology asset balance sheet | | |
|--|-----------------|--|
| Know where your information technology money is going | | |
| Any organization can begin to manage information technology costs by creating an asset balance sheet showing all equipment, software and data resources in use. This report is used to increase management awareness of the capital tied up in information technology resources. | | |
| The following is a prototype balance sheet you can adapt. The figures used here are for a large bank that spends about \$200 million per year on information technology. | | |
| After studying the balance sheet, bank management realized its \$2 billion in information technology assets were undermanaged. Furthermore, the organization now reuses its data, has merged decentralized facilities into corporate information technology and makes sure business managers spend time on policies relevant to the biggest capital element in its fixed asset base. | | |
| Hardware | Assets | |
| Centrally managed computers | \$120M | This is the most obvious component of the information technology base and the one that accountants track; information technology is just 5% of this bank's real assets |
| Distributed computers | \$84M | Mainly personal computers. In many organizations, PCs, workstations and departmental systems now account for more expenditures than do central expenditures |
| Network equipment | \$105M | Telecommunications facilities, often distributed across many different operating budgets |
| Distributed telecommunications | \$59M | Local-area networks and departmental equipment |
| Total hardware | \$368M | |
| Facilities (data center and operations) | \$192M | |
| Software | | |
| Applications development | \$420M | Software development expenditures are expensed. The bank had no idea how much it had spent to build the software in use, nor did the accounting system make it easy to find out. This and the figure for "other" software are really educated guesses. They also ignore replacement costs, which the firm's information technology planners estimated as at least \$1.2 billion, three times the original development cost |
| Other, including PC software | \$68M | |
| Total software | \$488M | |
| Data resources | \$1,200M | This is the estimated capital cost of the salaries, processing and storage incurred in creating the on-line data resources that are the basis for the bank's products and services. It is an indefinitely reusable asset. Data resources do not wear out as they are used |
| Total assets: | \$2,248M | |

Source: *Shaping the Future: Business Design Through Information Technology*

In late 1989, for example, top management in one of the world's 20 largest banks, viewing IS costs as too high, decided to cut the firm's IT budget from \$520 million to \$400 million. IS expenditures on maintenance, operations and ongoing development represented \$460 million of the \$520 million. Because support for core business services such as credit card processing could not be cut easily, IS' only practical choice was to cut corners on testing, operations and security, which meant cutting quality, service and reliability. The bank subsequently fired the hapless head of IS.

It is easy for managers to demand that

IT costs be brought under control, but it is reasonable for them to do so only if they acquaint themselves with the origins of those costs. They should understand, for example, that real expenditures grow much faster than software development budgets. We have seen that today's systems development costs compound tomorrow's committed budget for operations and maintenance.

Senior management should also recognize that a firm that moves toward basing most or even much of its operations, product delivery and customer service on its IT base has to make greater and greater investments in the infrastructures that support the practical and cost-efficient creation of individual applications.

No one said it was cheap

There is no cheap and easy way to build the global telecommunications networks and large-scale data and network management systems that constitute the corporate IT infrastructure. Most senior business managers, and many IS managers as well, are unaware of these basic realities. Tradition has led them to view IT as an annual expenditure.

In good times, the IS manager makes the case for an increase of X% or adds up all the approved new software development requests from the business units and factors in aggregate operations costs. In bad times, senior management demands either a decrease in the rate of growth or even an absolute cut in the budget (a very new phenomenon for IS).

Both approaches ignore the cost dynamics of IT. Assuming that every dollar of development generates 20 cents of operations and 40 cents of maintenance, one can see how IT costs are compounded.

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maintaining a level total budget, given the reality of compounding IT costs, would all but eliminate development within five years, virtually assuring that the firm would suffer competitively either from skimping on maintenance and operations and thus on customer service, quality and reliability or on development and thus on business innovation.

Maintaining or growing development is not possible without budget growth. A mere 10% growth in development, for example, would increase the overall IT budget by a factor of four in just five years. In light of these figures, the 15% rate of growth in IT expenditures across the U.S. economy in the 1970s and 1980s no longer seems so large.

It is clearly not enough even to keep systems development level to ensure adequate operations and maintenance. The natural rate is closer to 20%.

A GROWING NUMBER of senior executives are worried that IT costs may be out of control.

For firms that are aggressively spending on IT for effective competitive positioning, the rate is often closer to 30%. This latter rate can obviously be sustained for only a few years unless the benefit flow keeps pace with the costs.

But if a firm doesn't commit to a growth of at least 15% to 20% per year, it is effectively cutting back its IT capability, unless it can dramatically improve development productivity.

Infrastructure investments compound the problem of managing IT costs by adding to the fixed-cost base without providing direct benefits. Infrastructures are all cost; benefits come indirectly from the business applications they make practical.

There are many opportunities to reduce infrastructure costs by consolidating separate facilities, especially in the area of international telecommunications. One firm, for example, cut its total telecommunications costs by 30% by linking separate services to a shared high-speed, low-unit-cost fiber-optic trans-

mission facility, centralizing network management and routing international traffic so as to avoid high-cost countries.

The company should, of course, have done this years ago, but no one in the firm — literally — knew either how large the costs of telecommunications had become or where they were incurred.

Expenditures were scattered

across several hundred budgets.

With costs growing far faster than business profits, evidence of payoff limited or absent and small sanctioned increases in annual budgets generating long-term expenses, it is no wonder that corporate IS units are under siege.

Frustrated and worried, senior management asks, "How on earth, with the costs of PCs

dropping by the week and the price/performance of the micro-electronics industry continuing to improve by 30% per year, can our IS spending be growing by 10% to 20% per year with no increase in development or business productivity?"

The answer, "That's the way it is," is not a justification for uncontrolled IS budget growth but a challenge to business manag-

ers to face up to the reality of IT costs and work to ensure that the returns from IT investments exceed those costs. •

This is an excerpt from Peter G. W. Keen's forthcoming book Shaping the Future: Business Design Through Information Technology, to be published by the Harvard Business School Press in March. Copyright 1991 by Peter G. W. Keen.

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PC Magazine, 12: 11/90 (Ziff-Davis Publishing) "9600-BPS MODEMS" Breaking the Speed Barrier-PC LAN Labs tests seven rapid-fire modems complying with V.32, V.42 and V.42bis standards."

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NATIONAL BRIEFS

Shift at Concurrent

► **Concurrent Computer Corp.** has reorganized its North American sales and marketing groups to focus on three vertical market segments: government programs, technical systems and commercial systems. International operations have also been realigned, with the Asian/Pacific area being hooked together under centralized management. A single continental European operation has also been formed, the company said. The changes come in the wake of a second-quarter loss of \$12 million on net sales of \$62.2 million.

Looking better in Texas

► **Lone Star state-based Dell Computer Corp.** reported preliminary fourth-quarter results of \$167 million for fiscal 1991 last week, a 52% increase over the same period last year. The company announced preliminary unaudited revenue for the entire fiscal year of \$546 million, a 41% increase.

Success, success

► Focusing on strong growth figures from **IBM** and **AT&T**, Stamford, Conn.-based **Gartner Group, Inc.** reported that information industry revenue grew 8.1% in fourth-quarter 1990 as compared with the same period in 1989. The company said the industry's net profit margin — 7.8% for fourth-quarter 1990 — was the highest in two years. The report also noted that the fastest growing segment of the market was companies that make personal computer disk drives.

In with the INN crowd:

► **Electronic Data Systems Corp.** and Vero Beach, Fla.-based marketing communications firm **Redgate Communications Corp.** are teaming up to launch **Multimedia Marketing Networks Ltd.**, a company aimed at integrating electronic media technologies to wrap specialty niche marketing into news-oriented networks. The joint venture's maiden entry, to be implemented in North America and Europe by the close of the current year, is Industry News Networks, a private, multimedia network that promises to tie high-tech companies, chosen press members, analysts and consultants together by way of business television, audio links and facsimile machines.

Bellcore in search of new ideas

New Jersey firm paves way in data services for local telephone companies

BY GARY H. ANTHERS
CW STAFF

LIVINGSTON, N.J. — Irwin Dorros has six telephone numbers on his business card: two for his home and one each for his office, car, portable telephone and fax machine.

The executive vice president for technical services at Bellcore seems a trifle embarrassed about his tiny directory; he thinks telephones should reach people, not places.

Bellcore gets paid to think about things like that, and personal number calling — by which network software maps numbers to individuals rather than to hardware — is just one item in Bellcore's billion-dollar-per-year pipeline of projects, which range from blue-sky feasibility studies to product deployment.

Bellcore was established as the research arm of the regional Bell companies when they were spun off from AT&T in 1984, effectively compensating them for

the loss of Bell Telephone Laboratories, which stayed with AT&T. Bellcore was given the task of ensuring technical compatibility among the local telephone companies.

The seven regional Bell companies are forbidden to manufacture equipment, but Bellcore may and does design hardware and license the technology to manufacturers. Most of what Bellcore gives the regional Bells is software tools to help them manage and optimize their networks.

Little done in return

The regional Bells inherited 100 years of voice communications history from AT&T, but they have done little for the data communications market, providing mostly leased lines and dial-up data service, Dorros said.

Now, the Bell companies have seen the handwriting on the wall, Dorros said. "Our owners see the double-digit annual growth in information networks. Voice is

only growing at 3% per year."

Going after that market is not so simple, however. Before divestiture, a monolithic Ma Bell called the shots.

"Now, changing the infrastructure is very difficult," Dorros said. "To bring in [Integrated Services Digital Networks] or

intelligent networks is much more of a challenge because you have to synchronize the parties — local exchange carriers, equipment manufacturers, inter-exchange carriers and so forth."

Bellcore now provides the glue — standards and interface definitions — that AT&T once supplied to interconnect the nation's local telephone networks.

It does so by developing a uniform suite of technologies and vigorously participating in 54

Continued on page 86

Bang for the buck

The seven Bell system spin-offs each entrust to Bellcore \$110 million to \$160 million annually, and they give it generally good marks, praising in particular the tools Bellcore has given them to support network operations.

"Bellcore gives us a lot of leverage — \$7 of work for \$1," said Jerry Wilson, an executive at Bellsouth Services, Inc. He said power-saving technology developed by Bellcore has saved Bellsouth millions of dollars in operating costs.

However, the regionals do not put all their research dollars in one basket. In 1989, a sizable chunk of Nynex Corp.'s \$218 million research and development budget went into its own Science and Technology Center. Scientists at the 3-year-old center tailor Bellcore products and services for Nynex customers, and they explore new applications in areas such as artificial intelligence and speech recognition.

Nynex finds it more efficient to do its own development work if a particular large customer needs very fast or specialized response. "There's strength in numbers, but sometimes it's better if you go it alone," a Nynex spokeswoman said.

Sometimes the regionals do it alone for competitive reasons, although the seven regional companies compete in only a few business segments, such as cellular telephones. "Sometimes we don't want to share [our technology] with other regions," said Beverly Adkins, district manager for Bellcore administration at Southwestern Bell. But she said her company's funding for Bellcore has increased over the years as Bellcore continues to support old systems while developing new ones.

Some of the regionals have grown especially independent. US West, for example, wanted to be able to fund proprietary research through Bellcore. It persuaded Bellcore to bar for two years access to private projects funded by just one regional Bell.

"We were all kids cooped up in the playpen. Some stayed close, and some went off in other directions," the Nynex spokeswoman said.

GARY H. ANTHERS

Bellcore at a glance

- Established Jan. 1, 1984
- 1991 budget: \$1.17 billion
- Employees: 8,700
- 50% of projects are software-oriented; 300 systems now in use by Bellcore's owner firms
- Granted 170 U.S. patents; 120 pending
- Issued 6,000 product licenses to nonowner firms since 1984
- Defined Synchronous Optical Network standard for interfacing fiber-optic systems at speeds above 45M bit/sec.
- Defined switched, multimegabit data service for wide-area internetworking

Bellcore
Bell Communications Research

CW Chart: Doreen St. John

Lessor able to grow in tough market

BY NELL MARGOLIS
CW STAFF

Battered by breakneck competition and nationwide recession, scarred by a series of scandalous bankruptcies and squeezed by IBM Credit Corp., the independent computer leasing industry has lost some of its freewheeling boomtown allure.

However, there is still plenty of gold in the hills, industry executives and analysts insist. One example of this is El Camino Resources, Inc.

Northridge, Calif.-based El

Camino got a shot in the bottom line and possibly pointed the way of the future for embattled computer lessors last May when it sold 25% of its equity to two Japanese partners for an undisclosed sum.

Tokyo-based Applied Technology Corp. and Japan Leasing Corp., which is owned by a vast consortium of Japanese banks, insurance companies and commercial firms, each bought 12.5% of El

Camino; Japan Leasing has since placed a member on the El Camino board.



Earlier this month, El Camino spurred ahead once more, this time by acquisition. The company bought the computer systems leases of floundering lessor Econocom USA, Inc. in a cash deal valued at "upwards of \$20 million," according to one of the investment bankers who financed it.

The deal, industry analysts said, bails out Econocom, long troubled and reputedly for sale for the past year.

In addition, it virtually doubles El Camino's overall leasing clout and positions the company, which was formerly an IBM mainframe lessor, in the growing Application System/400 leasing market.

"At a time when leasing companies were reducing or liquidating their portfolios, our assets grew by 33% to [\$186.3] million," said Chief Executive Officer David Harmon, trumpeting El Camino's 63% revenue increase, which was logged in its latest fiscal year.



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Jay Dinwoodie, Senior VP/Information Systems, GE Capital Fleet Services

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Jay's users agree, especially the 45 mechanics who man the phones helping customers who have car trouble.

With SAA applications in multiple windows, they provide a level of service that's truly unique: diagnosing the problem, finding the best nearby garage, estimating the cost, negotiating discounts, determining warranty status, scheduling preventive maintenance and more; all while keeping detailed records, in minutes, in one phone call.

To a salesman stuck on the road, that's money in the bank. Ditto for GE Capital Fleet Services.

Easy to learn.

Says Jay, "We bring customers in and show them what we're doing. Nobody walks away unimpressed, and in fact, SAA's helped us win a number of new accounts."

Another big SAA advantage is training time, or lack of it.

"When we first got running, we went to the mechanics' area for a training session, to get some thoughts for writing a manual. We started at one end of the room, spent a few minutes with each guy, then moved on. We weren't half-way across the room when the first people were actually using the system, doing real work. We never did write a manual."

Easy to live with.

Their system is now running about 35,000 PC-host transactions a day, and Mr. Dinwoodie estimates that traditional technology would require about 250,000 transactions to accomplish the same work. He says, "Our SAA apps are just incredibly efficient, and they've been completely reliable."

How strange that some people are still asking if SAA is for real.

"It's just a question of confidence," says Jay. "We knew exactly where we wanted to go and that ultimately SAA was the only way to get there. So we took that first step, we've never looked back, and expectations—both ours and our customers'—have been exceeded."

For more details about SAA and GE Capital Fleet Services, call IBM at 1-800-IBM-6676, ext. 888.



Bellcore

FROM PAGE 83

standards groups. Dorros said Bellcore has more influence than any other firm, including AT&T, in standards development.

"We explore different ideas in network architecture, try them out and then let our owners pick and choose," said Alan G. Chynoweth, Bellcore's vice president for applied research.

Dorros said sophisticated users will not look to the regional companies to put together their corporate networks, and the telephone companies do not have that in mind anyway. They see their opportunity as interconnecting corporate networks to support technology such as electronic data interchange.

Bellcore is pushing for "dial tone for data," by which a company's local-area network can access the LANs of another company as easily as people make voice telephone calls. That is where switched multimegabit data service (SMDS) comes in. SMDS, a public packet-switched service operating at speeds between 1.5M bit/sec. and 45M bit/sec., was defined by Bellcore, and six of the seven regional companies have announced plans to offer it commercially.

Initially, the companies will sell SMDS as a way to interconnect high-speed LANs to metropolitan-area networks (MAN).

New head at Bellcore

Bellcore announced last week that George H. Heilmeier will succeed Rocco J. Marano as president and chief executive officer. Marano, 63, will become chairman before retiring May 1.

A Bellcore spokesman said Marano had planned to retire for some time.

Heilmeier, 54, will assume his post March 1. He is currently senior vice president and chief technical officer at Texas Instruments, Inc., where he heads research and development, engineering, corporate development and planning. He joined TI in 1977 after seven years of government service.

Marano, Bellcore's first employee, began planning the organization's structure in late 1982, more than one year before it was officially formed by the consent decree that broke up the Bell system.

Within two years, one or more long-distance carriers are expected to embrace SMDS, offering the ability to link LANs and MANs across the nation.

"SMDS will offer something new that private networks cannot: public, high-speed information interchange between companies that previously would not have considered dedicated interconnection," said Robert Camp-

bell, a division manager at Southwestern Bell Telephone Co.

"Bellcore is finally giving computer users the means to move data the way they want to, not the way the phone companies want to move data," said Dan Lynch, president of Interop, Inc. "Bellcore has a lot of good people working on it, and they're not shying away from the hard problems."

EXECUTIVE CORNER

AI Corp. promotes Chisholm

As executive vice president of worldwide operations at Waltham, Mass.-based **AI Corp.**, **Frank Chisholm** led the sales and support buildup credited by Chief Executive Officer **Robert Goldman** as a key factor in the firm's recent growth. Last

month, Chisholm was promoted to the post of president and chief operating officer at the firm he helped expand. Prior to joining the knowledge-base software developer, Chisholm, whose executive roots go back to the former **Cullinet Software, Inc.**,

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served as president and COO of **Soft-Switch, Inc.**

SPSS, Inc. has advanced **Nicole S. Williams** from senior vice president of finance and administration to executive vice president of worldwide operations. In addition to the post, which is a new creation at the Chicago-based software firm, Williams continues as a director

and secretary of the board.

Norman Klugman is the new president and COO of Atlanta-based **Advanced Telecommunications Corp.**, the nation's largest regional long-distance telecommunications firm, according to the company. The move promotes Klugman from his former post of executive vice president and moves

him from Boca Raton, Fla., to the firm's Atlanta headquarters.

Western Union Corp. CEO **Robert J. Amman** has been selected as vice chairman of Tustin, Calif.-based **MAI Systems Corp.** (formerly **MAI Basic Four, Inc.**). Amman, a veteran computer industry executive, assumes the vice chairmanship of MAI as the firm attempts to re-

position itself as a value-added reseller serving such targeted market niches as manufacturing and health care.

William N. Sick, 55, formerly CEO of **American National Can Co.** and once president of **Texas Instruments, Inc.**'s Semiconductor Division, has been named chairman of **Shipnet Systems, Inc.** in Lisle, Ill.

INTERNATIONAL BRIEFS

And there's more

► An already noted shakeout in the Western European computer market is far from over, according to **Philippe de Marcillac**, director of the European computer group at market research firm **Dataquest Europe**. De Marcillac confirmed that sluggish growth, low margins, increased competition, layoffs and consolidation are all currently affecting the region's hardware and software vendors.

A Japanese development

► Seattle-based **Pacific Software Publishing, Inc.** has opened a development center for U.S. software vendors hoping to break into or expand their presence in the Japanese microcomputer market. The Double-Byte-Character Support Center is equipped with Japanese hardware platforms, translation aides and technical and marketing training sources. Developers can also meet Japanese distributors at the company's Mercer Island, Wash., location.

A Far East connection

► One software developer already on its way to Japan is **Empress Software, Inc.** The Unix relational database developer has engaged Japanese software consultant **MKC Co.** to distribute Empress equipment in the Far East. The deal is expected to yield future joint development for the markets of Korea, China, Hong Kong and Singapore.

HP invades Japan

► According to a **Mitsubishi Electric Corp.** source, the firm is negotiating with **Hewlett-Packard Co.** to sell HP's reduced instruction set computing workstations in Japan. HP ranks second behind **Sun Microsystems, Inc.** in the engineering workstation market, according to **Dataquest Japan**.

Little effect from war

► The Gulf war will not slow aggressive growth plans at **Toshiba Corp.**, according to President **Joichi Aoi**. Predicting 15% growth this year, Aoi said earlier this month that semiconductor growth will begin rising toward a new peak after this spring. Toshiba did feel the effects of a weakened U.S. economy, however. It recently cut back production of its laptop personal computers by 50,000 units.

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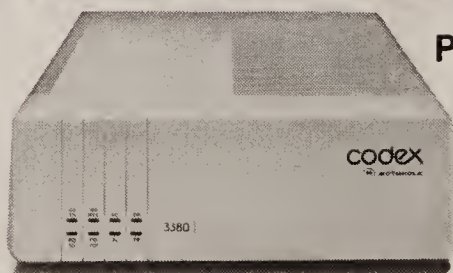
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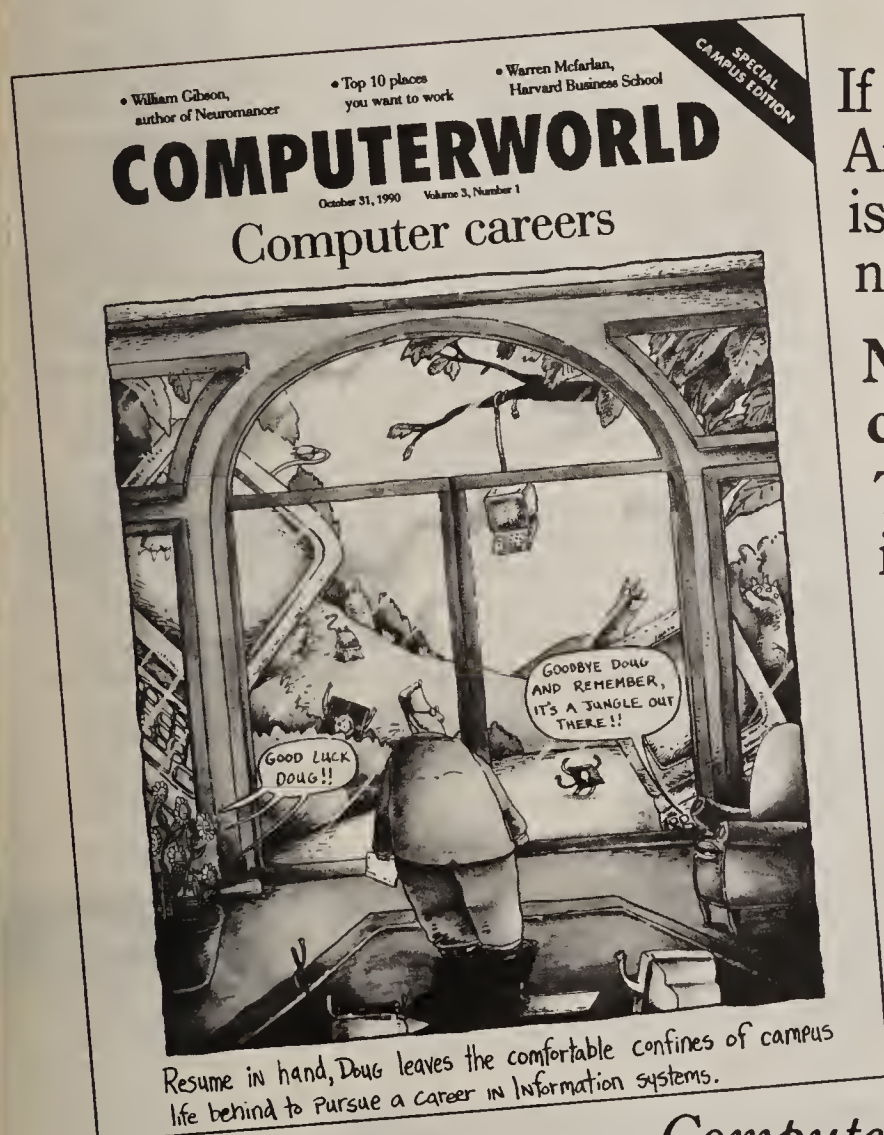
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Planned Editorial Features:

(subject to revision)

- Companies where computer career students want to work. And their top choices for: Information Systems, Engineering, Sales & Marketing, Technical Support, Research & Development.
- Prospects for minorities in computing.
- Merits of an Electrical Engineering degree for a computer career.
- Information Systems salaries from Computerworld's annual survey with the Data Processing Management Association.

COMPUTER CAREERS

New posts for disaster planning

BY JON WILLIAM TOIGO
SPECIAL TO CW

Calamities such as Hurricane Hugo, the San Francisco earthquake and the Hinsdale, Ill., switching station fire — along with tougher legal and safety regulations set by federal authorities — have prompted companies to make more room for a new kind of information systems employee: the disaster recovery planner.

According to a biannual survey of financial institutions conducted by CHI/COR Information Management, Inc. in Chicago, disaster recovery planning is now being considered by 80% of the responding companies. More than 95% of the companies now maintain a plan for the recovery of IS centers.

These numbers represent a substantive increase over 1986 statistics, which found that fewer than 47% of the firms possessed a centralized disaster recovery planning function.

All of this translates into the creation of new posts for disaster recovery planners, especially in the more sensitive areas such as financial organizations, utilities firms, medical institutions and companies located in disaster-prone areas. These planners, who can expect salaries from \$45,000 to \$75,000 (see chart), develop disaster recovery plans

of action and continually rewrite, update and maintain them.

At First Security Service Co., a financial services vendor for several Utah and Idaho banks, disaster recovery planning was instituted as a formal function for practical and legal reasons, according to Charles Fox, disaster recovery manager.

"We had a couple of airplane crashes near our facility, and we are located near the Wasatch Front fault line — somewhat similar to the San Andreas fault — that exposes us to earthquake threats. Disaster recovery planning was instituted because of these situations as well as in response to [Office of the Comptroller of the Currency] banking circulars and regulations," he says.

Protecting banks

Ostensibly, the financial industry, because of the importance of on-line information, provides the most opportunities for the disaster recovery planner — but only in certain areas.

"The banks that hold the greatest amount of promise are the ones with \$500 million and less in assets. Those are the institutions that have escaped the ire of the federal regulators these

past few years," says Tari Schreider, president of Contingency Planning Research in Jericho, N.Y. "They're the ones coming under the greatest scrutiny because the vast majority of those banks still do not have di-

Schreider, the Public Service Commission has played a part in the boom by more seriously regulating the on-line availability of the utility companies. "But even more important than that is the critical nature of what the utilities do. If they have to stop to work on maintenance, the cost for them to reopen a plant is millions of dollars a day."

Trailing behind utilities in disaster recovery planning is the medical industry. For legal and safety reasons, hospitals are turning to these planners for an added measure of security.

Where they fit in

Because disaster recovery planners are fairly new, a certain fuzziness exists about where they fall within the corporate hierarchy. Although 46% of the respondent banks in the CHI/COR study indicate that a vice president (of IS or otherwise) was responsible for disaster recovery planning, professional organizations for disaster recovery planners suggest that the planner's status is rarely so grand. Disaster recovery planners are typically drawn from the systems analysis or IS operations staff.

"Many people are choosing disaster recovery planners by default. Once companies decide to install a plan, they pick someone out of the hat. Usually, that is someone out of data processing," says John Bannon, president of the Delaware Valley Disaster Re-

covery Information Exchange, a professional association based in Cherry Hill, N.J., with more than 2,000 members predominantly from New York, New Jersey and Pennsylvania.

One of the biggest hurdles that disaster recovery planners face is not being treated as bona fide professionals. Quite often, a contingency planner is a company technical staff member who has had responsibilities for planning added to an already full plate of other duties, according to the CHI/COR study.

Schreider says there is much to do in developing a disaster recovery plan — not just for an IS department but for the total business. "If that disaster recovery planner is not busy every day doing new things and updating the plan and writing test scripts and handling vital records management, then he's not doing his job properly," she says.

Bannon, who served as manager of security and procedures for RCA and General Electric Co. for 27 years, suggests that disaster recovery planner positions should be established at the highest levels of the company, making information security and disaster recovery planning positions equivalent to the chief operating officer or chief financial officer. Bannon says he advocates a professional certification of disaster recovery planners to help make this ascendancy possible.

Toigo is a free-lance writer based in Clearwater, Fla.

Disaster recovery personnel salaries

Based on 375 resumes reviewed

| | |
|---|----------|
| Disaster recovery manager 6+ years' experience | \$75,000 |
| Disaster recovery coordinator 4+ years' experience | \$55,000 |
| Disaster recovery analyst 2+ years' experience | \$45,000 |

Source: Contingency Planning Research, Inc. CW Chart: Paul Mock

saster recovery plans in place."

According to Howard Peace, president of Peace of Mind Consulting in Blountville, Tenn., many firms follow the lead of the financial industry. "In a recession, managers work on asset retention. So it's not surprising that they would focus on safeguarding data center equipment."

Another industry adding planning functions to the IS roster is the utility sector — particularly companies that rely on nuclear and fossil fuel. According to

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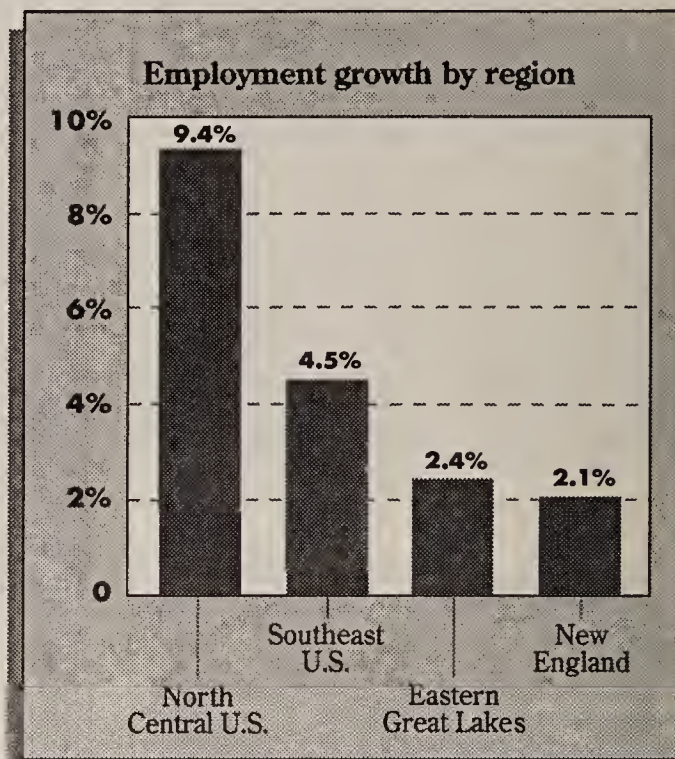
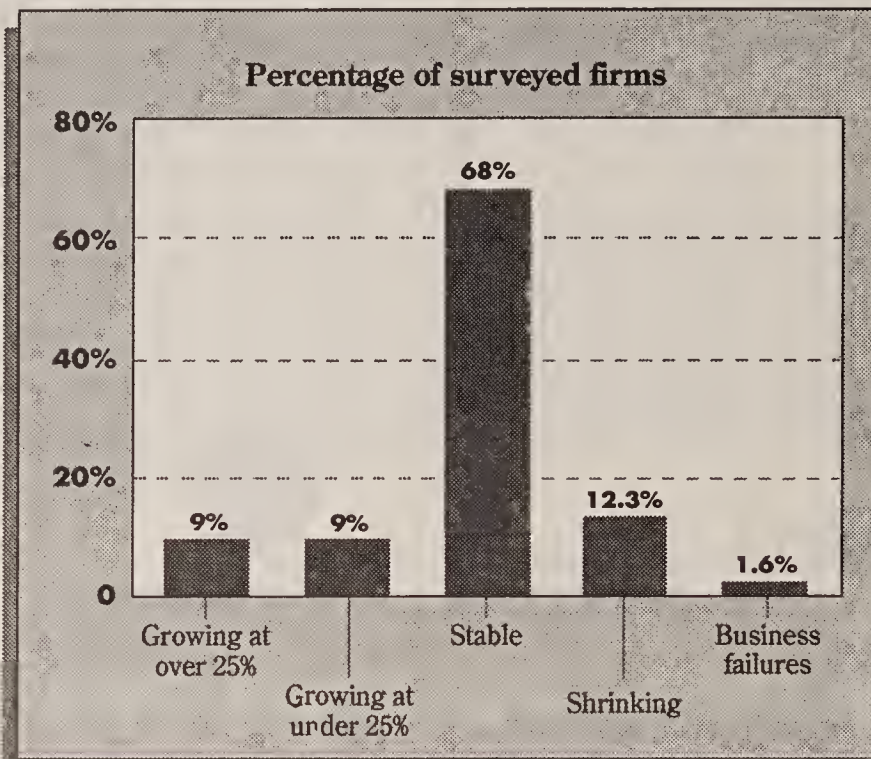
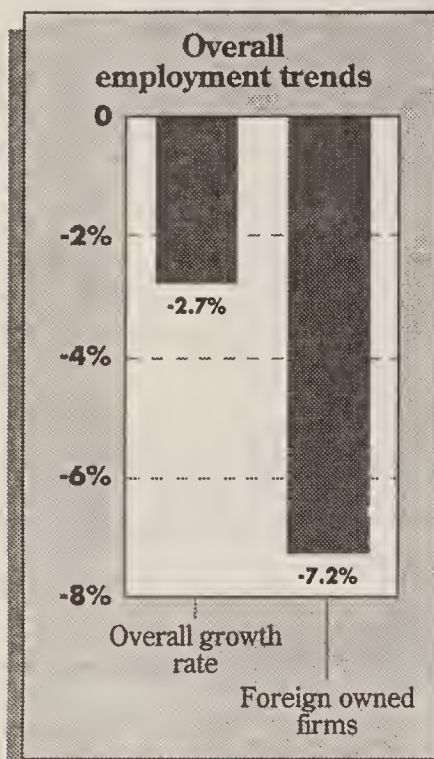
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Computerworld/CorpTech Career Index

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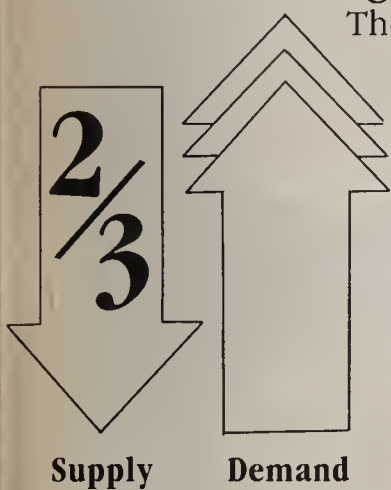
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who



would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

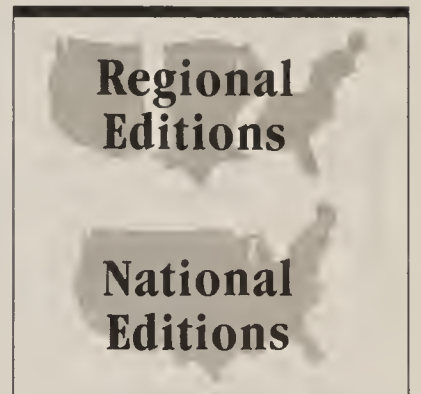
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Computerworld needs just 3 working days for your ad to appear

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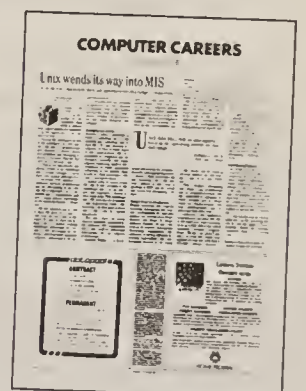
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Users find more savings in leasing used equipment

The short-term savings provided by leasing has long been a lure for information systems managers not wishing to tie up funds or get locked into technology that will someday be outdated. During a recession, managers are even more likely to lease to cut costs. In addition, they turn to used equipment rather than new to garner extra savings. This shift in buying patterns is causing only a small rise in overall leasing revenues because less income is generated from used systems. These are the views of Computer Dealers and Lessors Association (CDLA) President Ken Bouldin, who spoke with Associate Editor Cathy Duffy about the recent CDLA/Gartner Group, Inc. 1990 survey of leasing vendors.

Q: Why are users starting to lease more used equipment?

A: In 1989, there was still a lot of new equipment being shipped, so there were more opportunities to lease new equipment than used. But now, the general economic conditions are causing companies to tighten their belts and lease used equipment at substantially lower prices.

Q: When would users be forced to lease new systems?

A: They would have to lease new equipment in cases where the application absolutely requires leading-edge

capabilities, or if a piece of equipment is just not available on the used market.

Q: How much savings could a user potentially achieve by leasing used computers over new?

A: It all depends on the type of equipment. If a customer were to lease a very late-generation machine that was still selling at a high percentage of its new price, then the savings would be small — maybe 10% to 15%. But it's not uncommon to find machines that are trading at only 20% of the list value. In those cases, the savings could be in excess of 50%.

Q: If the leasing industry is making less money because of the shift toward used equipment, will overall leasing prices rise?

A: No. Leasing companies will not boost prices to compensate for any losses because the competition is too keen. Users will see the leasing companies tightening their belts in other ways — mainly, by surviving on a lower volume and diversification of product offerings.

Q: What does the future hold for the leasing industry?

A: The entire future of the leasing industry of high-tech equipment and computers is going to hinge on IBM. It sets such a pace and direction; you might say it's the barometer of the industry.

LEASING INDUSTRY OVERVIEW

The buy, sell or trade arm of leasing is slowly edging ahead

U.S. computer lessor and dealer industry volume growth trends (in billions)



Top concerns identified by leasing companies

1. IBM/IBM Credit Corp. (ICC) practices
2. Competition
3. Economy
4. Product life cycles
5. Funds availability
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7. Tax laws

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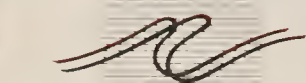
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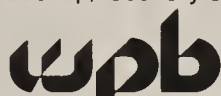
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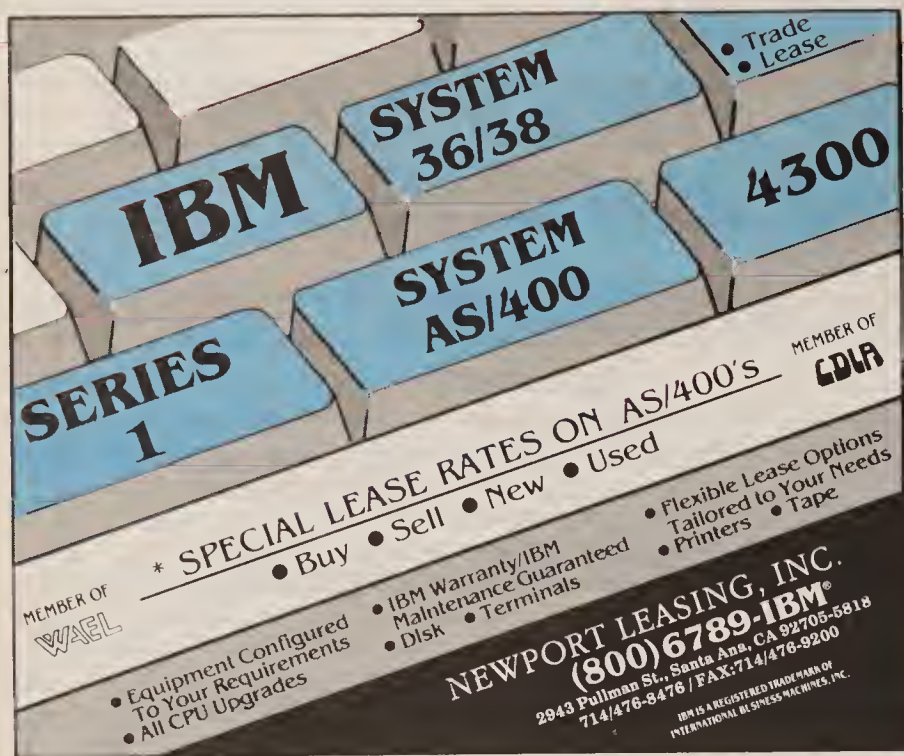
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| AT Model 239 | \$750 | \$925 | \$700 |
| AT Model 339 | \$925 | \$1,000 | \$900 |
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| Portable 286 | \$1,100 | \$1,350 | \$1,000 |
| SLT 286 | \$2,300 | \$2,500 | \$2,000 |
| Portable 386 | \$2,300 | \$2,500 | \$2,200 |
| LTE 286 | \$2,200 | \$2,500 | \$1,900 |
| Deskpro 286 | \$800 | \$1,000 | \$700 |
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Making a CASE for better training

BY ALICE LAPLANTE
SPECIAL TO CW

Like so many other products of the computer age, computer-aided software engineering (CASE) was first hailed as a miracle solution that was going to remedy such software development issues as overdue applications, bug-riddled programs, poor user requirements analysis and difficult documentation.

In practice, however, CASE is proving to be an important aid to programmer productivity, but it's no cure for all the issues of applications development. In fact, its growth within information systems organizations is slower than many managers and consultants expected. One reason for this, CASE experts say, is improper training.

One reason CASE training lags behind other subjects is that it is more expensive. "CASE is difficult to teach. CASE training is 33% more expensive than training for other IS subjects," says Sharon Williams, supervisor of IS staff development and training at Kaiser Foundation Health Plan in Walnut Creek, Calif.

Nevertheless, the full benefits will not come until proper training is applied. "Until we teach people to be better analysts, communicators and designers and to better understand the

business they are in, CASE will be a promise unfulfilled," says Vaughan Merlyn, a partner at Ernst & Young's Center for Information Technology and Strategy in Boston.

Indeed, at a recent training conference, Michael R. Danziger, a senior manager at Deloitte & Touche in New York, headed off a session by asking how many members of the audience had successfully implemented CASE training. Only one man raised his hand. His question: "Could you please define successful?"

Back to basics

According to CASE experts, there are some basic precepts of progressive CASE training:

- CASE methodology and techniques must be taught in addition to the CASE tools being used in a specific project.
- CASE training must be customized to fit each corporation's unique needs.
- Each student in a CASE class must have hands-on access to a keyboard.
- There should be "just-in-time" training — training provided just before, or even during, a CASE pilot project.
- Management expectations of productivity gains must be tempered with reality.

For example, at Boeing Computer Services in Bellevue,

Wash., where dozens of CASE projects are under way simultaneously, the biggest challenge for the IS training department is overcoming a poor understanding of software design methodology independent of the CASE tools used.

"Because CASE is such a brand-new technology, it is not just a tools issue," says Wendy Wagner, project manager for CASE deployment at Boeing. "For example, teaching word processing is easy because people have a basic understanding of how to write a letter or a memo. But often, even our most experienced programmers do not know enough about software design methodology concepts such as data or process modeling."

Boeing has tried to solve this problem by having software engineers take prerequisite overview courses on CASE concepts and methodology. To qualify the students even more, Boeing trainers interview each potential CASE student to assess his skill level.

In addition to integrating methodology and tool training, many consultants recommend that CASE be taught within the context of an appropriate size

software development project. "Too many companies bite off more than they can chew with their first CASE project," Danziger says.

For instance, at Tellabs, Inc. in Lisle, Ill., the initial CASE project was carefully planned at a slow pace, according to Steven Morvich, chief information officer at Tellabs.

First, Morvich picked a team of seven programmers from his IS staff. Then he chose a low-risk but high-payoff CASE pilot project: an application that would help Tellabs, a telecommunications equipment vendor, track the performance and efficiency of its supplying vendors.

With the help of Andersen Consulting, Morvich put together a CASE educational program that included pre-project, hands-on training to familiarize his design team with the tools they would be using, initial classroom overview training on what CASE is, actual work on the project and advanced training for more sophisticated CASE techniques as the project progressed.

The project took six months to complete and was a success, says Morvich, who then took the seven IS employees from that project and "seeded" them into other pilot projects, using the same mix of classroom and actual project

work in the educational process. "This way, we grew into CASE gradually and didn't shoot ourselves in the foot," Morvich says.

In another approach, Kaiser placed a strong emphasis on end-user involvement in CASE training. But because Kaiser has many CASE projects going on at once — each of which involves an entire user community as well as a data center design and programming team — the desire for end-user involvement raised serious training, planning and communication issues, Williams says.

Kaiser subsequently worked out a process: When a user makes a request for a CASE application project, in addition to filling out the usual IS paperwork, he joins a team that consists of potential users of the new system and data center personnel. The team works with Williams and her training staff to develop a curriculum for all the training courses that must be offered to accomplish the project.

After all the training required for CASE, many users ask: Is it worth it?

Organizations with successful CASE implementations say the quality improvement in their software projects makes it a good investment. "Before, we spent two years developing a system and a year correcting it; now, we finish a project, and it's done," Morvich says.

LaPlante is a free-lance writer based in Palo Alto, Calif.



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INDUSTRY ALMANAC

RECOMMENDATION CHANGES

DOWNGRADED FROM HOLD TO AVOID: **Mips Computer Systems, Inc.** (Bear, Stearns & Co.). Reason: Continued pricing pressure in desktop market combined with high costs associated with new R4000 microprocessor make earnings unpredictable.

DOWNGRADED FROM BUY TO HOLD: **Texas Instruments, Inc.** (Prudential-Bache Securities, Inc.). Reason: Little room for near-term share price improvement, but company holds long-range promise as it whittles defense business and focuses on semiconductors.

DOWNGRADED FROM BUY TO NEUTRAL: **Paychex, Inc.** (Alex. Brown & Sons, Inc.). Reason: Recession, higher unemployment have sliced into paycheck service sales. One quarter of firm's clients have moved from weekly to biweekly payroll, further reducing business.

UPGRADED FROM HOLD TO BUY: **Lotus Development Corp.** (Prudential-Bache). Reason: Will soon close product line gaps; still a high-risk buy, but troubles have already been reflected in stock price.

UPGRADED FROM MARKET PERFORMER TO OUTPERFORM: **Autodesk, Inc.** (Montgomery Securities). Reason: U.S. sales up last month, portending earnings gains this quarter.

UPGRADED FROM SELL TO HOLD: **Unisys Corp.** (Prudential-Bache). Reason: Rumors of impending asset sales spark hope of offsetting financial troubles; caution warranted, though, as first-quarter loss of \$100 million expected.

INDICATORS

The Dow Jones industrial average continues to bound skyward, rising 11.4% during the past four weeks. Analysts bristled, however, at computer firms whose share prices have shot up because of the rally and are concerned that profit-taking may stamp the stocks back down.

Witness the latest investment judgments from Donaldson Lufkin & Jenrette Securities Corp. analyst Scott Smith, who cited "price appreciation" as he knocked down ratings on **Knowledgeware, Inc.**, **Micrografx, Inc.**, **Microsoft Corp.** and **Borland International, Inc.**

Charles Taylor Jr. analyst at Prudential-Bache, had also rated Microsoft a "hold," along with **Policy Management Systems Corp.**, calling their stocks "fully valued." However, Taylor recently upgraded his assessment of the two firms to "buy," foreseeing healthy earnings in the latter half of the year and subsequent price increases.

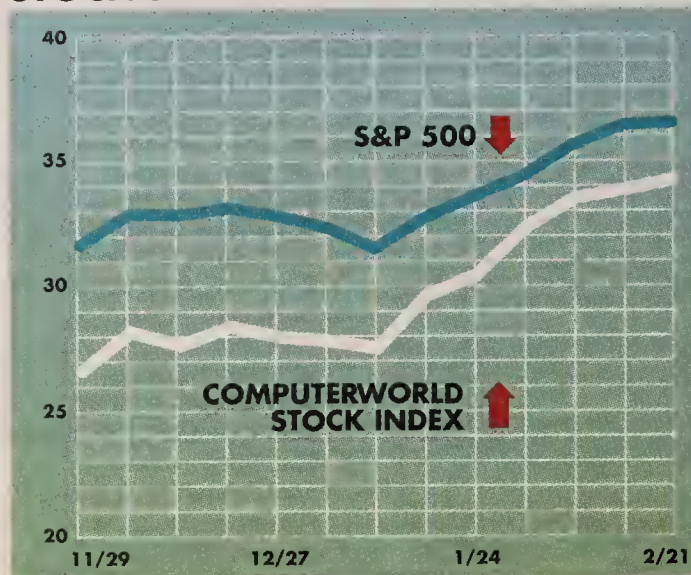
FINANCIAL SPOTLIGHT

Earnings reports can indeed impact stock prices, as demonstrated by market movement last week. Shares of **Software Toolworks, Inc.**, an applications vendor based in Novato, Calif., sank 20% Friday, losing 5/8 of a point to 2 1/2 when the firm released poor quarterly financials that day.

After it posted an 18% jump in profits for its first quarter on Tuesday, **Hewlett-Packard Co.**'s stock gushed up nearly 14%, increasing 5 1/2 points to 45 5/8. Investors were especially giddy about these results in light of the company's previous three disappointing quarters. HP is currently rated as a "hold" by Prudential-Bache, while Paine Webber, Inc. called the stock "unattractive."

KIM S. NASH

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- AT&T extended its \$90 per share tender offer for NCR Corp. through April last week, and NCR scooped up 8% of its holding to create an employee stock ownership plan. NCR gained 1 3/8 points, closing Thursday at 93 3/8, while AT&T slipped 5/8 of a notch to 33 3/4.
- Sun Microsystems, Inc. also advanced last week, closing Thursday at 30 3/4, up 2 1/2 points.
- Corporate Software, Inc. gained 2 1/2 points and rose to 11 after revealing that fourth-quarter profits were down compared with the same period last year.
- Novell, Inc. and Lotus Development Corp. both lagged last week, with Novell sliding 1 7/8 points to 45 1/8, and Lotus losing 1 1/4 points to 21 3/4.
- Digital Equipment Corp. said it hopes to horn in on the minisupercomputer territory of Cray Research, Inc. with a new version of the VAX 9000. Investors drove DEC shares up 2 5/8 points to 76 1/2.

Computerworld Stock Trading Summary

CLOSING PRICES THURSDAY, FEB. 21, 1991

| TOP PERCENT GAINERS | | | | TOP PERCENT LOSERS | | | |
|--|--------|-------------------------|---------------------------|-----------------------------------|-------|--------|--|
| Selecterm Inc. | 30.00 | System Software Assoc. | -36.36 | NYS | 65.25 | 45.25 | |
| Corporate Software | 29.41 | Phoenix Technologies | -16.67 | OTC | 60.25 | 32.00 | |
| Artel Communication Corp. | 27.78 | Goal Systems Int'l | -13.64 | OTC | 30.00 | 12.00 | |
| Amplicon Inc. | 21.43 | Network Equipment Tech. | -12.96 | OTC | 42.50 | 17.75 | |
| Ultimate Corp. | 20.00 | Storage Technology | -11.11 | OTC | 21.50 | 11.00 | |
| TOP DOLLAR GAINERS | | | | TOP DOLLAR LOSERS | | | |
| Hewlett Packard Co. | 7.00 | System Software Assoc. | -11.00 | NYS | 53.75 | 12.25 | |
| Adobe Systems Inc. | 3.25 | 3M Corp. | -3.63 | OTC | 11.88 | 0.88 | |
| Digital Equipment Corp. | 2.63 | Storage Technology | -3.38 | OTC | 15.00 | 4.38 | |
| Sun Microsystems Inc. | 2.50 | American Mgmt. Systems | -2.25 | NYS | 16.88 | 4.38 | |
| Corporate Software | 2.50 | Goal Systems Int'l | -2.25 | OTC | 17.75 | 7.75 | |
| Communications and Network Services Up 0.09% | | | | Computer Systems Up 3.65% | | | |
| OTC | 19.00 | 5.38 | 3 COM Corp. | 8.88 | -0.75 | -7.79 | |
| NYS | 69.75 | 52.50 | American Info Techs Corp. | 66.00 | -1.63 | -2.40 | |
| NYS | 44.13 | 29.00 | AT&T | 33.25 | -0.63 | -1.85 | |
| OTC | 9.63 | 0.88 | Artel Communication Corp. | 2.88 | 0.63 | 27.78 | |
| NYS | 56.25 | 39.50 | Bell Atlantic Corp. | 49.38 | -1.38 | -2.71 | |
| NYS | 57.63 | 49.00 | Bellsouth Corp. | 53.25 | 0.25 | 0.47 | |
| OTC | 16.38 | 8.25 | Compression Labs Inc. | 15.38 | 0.38 | 2.50 | |
| NYS | 39.13 | 23.38 | Contel Corp. | 39.00 | 1.00 | 2.63 | |
| OTC | 4.50 | 1.75 | Data Switch Corp. | 4.06 | -0.06 | -1.50 | |
| NYS | 26.75 | 8.88 | Digital Comm. Assoc. | 15.63 | 0.38 | 2.46 | |
| OTC | 23.75 | 12.25 | Dynatech Corp. | 20.50 | -1.00 | -4.65 | |
| OTC | 12.88 | 5.50 | Fibronix Int'l Inc. | 9.13 | 0.63 | 7.35 | |
| OTC | 4.00 | 1.75 | Gandalf Technologies Inc. | 2.81 | -0.06 | -2.16 | |
| NYS | 4.50 | 1.63 | General Datacomm Inds. | 2.75 | 0.00 | 0.00 | |
| NYS | 34.13 | 23.50 | GTE Corp. | 31.13 | 0.75 | 2.47 | |
| OTC | 7.00 | 0.75 | Infotron Systems Corp. | 0.88 | 0.00 | 0.00 | |
| NYS | 60.88 | 40.25 | ITT Corp. | 56.63 | -0.38 | -0.66 | |
| OTC | 44.13 | 17.88 | MCI Communications Corp. | 26.50 | -0.38 | -1.40 | |
| OTC | 21.00 | 2.75 | Microcom Inc. | 5.25 | 0.25 | 5.00 | |
| NYS | 34.38 | 4.00 | Network Equipment Tech. | 5.88 | -0.88 | -12.96 | |
| OTC | 14.63 | 4.00 | Network General | 11.50 | 0.25 | 2.22 | |
| OTC | 15.50 | 8.13 | Network Systems Corp. | 11.25 | -0.50 | -4.26 | |
| NYS | 31.00 | 22.13 | Northern Telecom Ltd. | 30.25 | 0.13 | 0.41 | |
| OTC | 51.25 | 17.25 | Novell Inc. | 45.63 | -1.88 | -3.95 | |
| NYS | 89.50 | 67.00 | Nynex Corp. | 76.00 | 0.25 | 0.33 | |
| NYS | 47.88 | 36.25 | Pacific Telesis Group | 41.88 | -0.88 | -2.05 | |
| ASE | 12.00 | 4.75 | Penril Corp. | 12.00 | 1.25 | 11.63 | |
| NYS | 29.13 | 8.88 | Scientific Atlanta Inc. | 15.38 | -1.00 | -6.11 | |
| NYS | 59.50 | 47.25 | Southwestern Bell Corp. | 54.75 | -1.25 | -2.23 | |
| NYS | 46.38 | 20.63 | United Telecom | 24.50 | -1.13 | -4.39 | |
| NYS | 40.75 | 32.38 | US West Inc. | 39.13 | -0.63 | -1.57 | |
| Semiconductors Up 2.02% | | | | Peripherals & Subsystems Up 0.34% | | | |
| NYS | 25.88 | 19.00 | Advanced Micro Devices | 21.75 | -0.63 | -2.79 | |
| NYS | 9.25 | 5.50 | Analog Devices Inc. | 9.13 | 0.50 | 5.80 | |
| OTC | 23.50 | 5.25 | Chips & Technologies | 11.50 | 0.00 | 0.00 | |
| OTC | 52.00 | 28.00 | Intel Corp. | 49.50 | 2.25 | 4.76 | |
| NYS | 13.00 | 5.13 | LSI Logic Corp. | 8.13 | -0.38 | -4.41 | |
| NYS | 16.38 | 6.75 | Micron Technology | 13.13 | 0.88 | 7.14 | |
| NYS | 88.38 | 45.75 | Motorola Inc. | 61.25 | 2.38 | 4.03 | |
| NYS | 8.88 | 3.00 | National Semiconductor | 7.25 | 0.75 | 11.54 | |
| NYS | 44.00 | 22.50 | Texas Instruments | 42.00 | 1.25 | 3.07 | |
| OTC | 12.25 | 3.00 | VLSI Technology | 7.38 | -0.31 | -4.07 | |
| ASE | 14.88 | 4.00 | Western Digital Corp. | 4.25 | -0.13 | -2.86 | |
| Software & DP Services Off 0.39% | | | | Leasing Companies Up 9.93% | | | |
| OTC | 8.75 | 0.56 | Alliant Computer Sys. | 1.00 | 0.00 | 0.00 | |
| ASE | 18.88 | 10.00 | Amdahl Corp. | 15.75 | -0.25 | -1.56 | |
| OTC | 61.50 | 24.25 | Apple Computer Inc. | 59.00 | 1.88 | 3.28 | |
| OTC | 13.88 | 4.25 | Archive Corp. | 7.63 | 0.75 | 10.91 | |
| OTC | 48.75 | 14.25 | AST Research Inc. | 45.88 | 1.13 | 2.51 | |
| NYS | 6.88 | 3.88 | Bolt, Beranek & Newman | 6.63 | 0.00 | 0.00 | |
| NYS | 18.38 | 4.50 | Commodore Int'l | 17.88 | 0.88 | 5.15 | |
| NYS | 74.13 | 35.50 | Compaq Computer Corp. | 71.63 | 1.50 | 2.14 | |
| OTC | 3.50 | 0.13 | Computer Automation Inc. | 1.13 | -0.13 | -10.00 | |
| NYS | 21.63 | 6.75 | Control Data Corp. | 12.25 | -0.38 | -2.97 | |
| NYS | 20.88 | 8.38 | Convex Computer | 17.75 | 1.63 | 10.08 | |
| NYS | 51.25 | 20.00 | Cray Research Inc. | 41.00 | -0.75 | -1.80 | |
| NYS | 13.25 | 3.50 | Data General Corp. | 9.50 | 0.25 | 2.70 | |
| NYS | 3.88 | 0.75 | Datapoint Corp. | 2.38 | 0.38 | 18.75 | |
| OTC | 27.38 | 5.63 | Dell Computer Corp. | 26.63 | 1.88 | 7.58 | |
| NYS | 95.13 | 45.50 | Digital Equipment Corp. | 76.50 | 2.63 | 3.55 | |
| NYS | 36.13 | 13.75 | Harris Corp. | 24.00 | -1.50 | -5.88 | |
| NYS | 50.38 | 24.88 | Hewlett Packard Co. | 47.25 | 7.00 | 17.39 | |
| NYS | 139.75 | 96.25 | IBM | 135.50 | 0.38 | 0.28 | |
| OTC | 14.00 | 7.75 | Information Int'l | 9.25 | 0.50 | 5.71 | |
| OTC | 23.50 | 10.50 | Intergraph | 18.50 | 0.25 | 1.37 | |
| NYS | 3.13 | 0.50 | MAI Systems Corp. | 0.75 | 0.00 | 0.00 | |
| NYS | 149.88 | 114.00 | Matsushita Electronics | 136.13 | 0.63 | 0.46 | |
| OTC | 26.00 | 9.00 | Mentor Graphics Corp. | 17.00 | 0.00 | 0.00 | |
| NYS | 93.38 | 44.50 | NCR Corp. | 93.13 | 1.25 | 1.36 | |
| OTC | 35.50 | 11.00 | Pyramid Technology | 20.50 | 0.88 | 4.46 | |
| OTC | 34.00 | 9.75 | Sequent Computer Sys. | 14.75 | 0.75 | 5.36 | |
| NYS | 43.50 | 18.00 | Silicon Graphics | 40.13 | 0.75 | 1.90 | |
| NYS | 30.25 | 14.63 | Stratus Computer Inc. | 28.63 | 1.00 | 3.82 | |
| OTC | 37.25 | 15.00 | Sun Microsystems Inc. | 30.63 | 2.50 | 8.69 | |
| NYS | 30.13 | 8.88 | Tandem Computers Inc. | 14.00 | 0.13 | 0.90 | |
| NYS | 39.50 | 23.50 | Tandy Corp. | 31.88 | -0.25 | -0.78 | |
| OTC | 35.50 | 6.75 | Teradata | 13.75 | 0.25 | 1.85 | |
| NYS | 7.88 | 1.38 | Ultimate Corp. | 5.25 | 0.88 | 20.00 | |
| NYS | 17.13 | 1.75 | Unisys Corp. | 4.00 | 0.38 | 10.34 | |
| ASE | 6.25 | 2.00 | Wang Labs Inc. (b) | 3.38 | 0.13 | 3.85 | |
| Software & DP Services Off 0.39% | | | | Leasing Companies Up 9.93% | | | |
| OTC | 50.75 | 17.00 | Adobe Systems Inc. | 45.50 | 3.25 | 7.69 | |
| OTC | 44.50 | 16.75 | Aldus Corp. | 41.00 | 0.50 | 1.23 | |
| OTC | 24.00 | 11.50 | American Mgmt. Systems | 21.00 | -2.25 | -9.68 | |
| OTC | 18.25 | 7.50 | American Software Inc. | 13.00 | 0.88 | 7.22 | |
| NYS | 3.75 | 1.38 | Anacomp Inc. | 2.50 | -0.25 | -9.09 | |
| OTC | 23.50 | 10.00 | Analysts Int'l | 14.75 | -0.75 | -4.84 | |
| OTC | 15.13 | 4.88 | Ashton Tate | 7.13 | 0.25 | 3.64 | |
| OTC | 10.25 | 4.00 | ASK Computer Sys. | 6.38 | -0.50 | -7.27 | |
| Software & DP Services Off 0.39% | | | | Leasing Companies Up 9.93% | | | |
| OTC | 12.75 | 6.88 | Amplicon Inc. | 12.75 | 2.25 | 21.43 | |
| OTC | 4.38 | 0.31 | Capital Associates | 0.56 | 0.00 | 0.00 | |
| NYS | 28.50 | 14.63 | Comdisco Inc. | 27.25 | -0.50 | -1.80 | |
| OTC | 16.25 | 9.25 | LDI Corporation | 12.25 | 0.00 | 0.00 | |
| OTC | 5.88 | 2.25 | Selecterm Inc. | 3.25 | 0.75 | 30.00 | |

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RISC

FROM PAGE 1

direct sales force, so they can't out-distribute us," McNealy said in a meeting with *Computerworld*. "I don't know where they think they can add value."

Both IBM and Hewlett-Packard Co. have plans for low-end, low-cost RISC machines, and HP's is slated to debut at the end of March. But IBM has not licensed its architecture to others, and HP has not done so widely, although it would both like to.

With Mips Computer and Sun vying for the larger shares, a market heavily weighted in one direction would draw resources such as software developers to it like ants to a picnic. This could result in more connectivity, more applications and lower costs to users.

If Sun's architecture stays on

top, it would benefit from an expanding workstation market estimated to grow over sixfold by 1995, according to Tom Kucharvy, an analyst at Summit Strategies, Inc., a market research firm in Boston.

Sun's share is currently estimated at 53%, in units, for 1990. Mips, through its major vendors Silicon Graphics, Inc. and Digital Equipment Corp., has about 25%, according to Summit.

Without a change to the status quo, Kucharvy estimated, Sun's share would only decline to 45% by 1995, and Mips would dive to 15%. However, if Mips is able to corner more high-profile vendors, Kucharvy estimated its share would climb to 30%, leaving 40% for Sun.

It has taken until this year to even consider one architecture taking over the RISC market. Analysts, including Michael Goulde at Open Systems Advisors, Inc. in Boston, agreed that

"it's a tumultuous period, reshaping the face of the workstation industry."

Sun licensed its first vendor, Solbourne Computer, Inc., in 1987. Sun compatibles and clones just began hitting the market with force at Comdex Fall '90. Although Sun has had some success with U.S. firms signing on, they generally have been smaller ones.

Mips has signed up larger U.S. firms such as DEC and also claims some Asian companies. It offers systems for resellers as well as the basics of processors and compilers.

Most vendors also evaluated Motorola, Inc.'s 88000 processor, but few have chosen it. The major reason given for this by Dick Snyder, president and general manager of Prime Computer, Inc., and others was, "In our judgment, the market would come down to two architectures: Mips and Sparc."

Technology vs. clout

Even some allies of Sun said its Scalable Processor Architecture (Sparc) is not the best technology available. But a viable business plan does not rely solely on technology, and Sun's market presence carries clout.

Vendors who have signed up for Sun's RISC standard, such as Tatung Science and Technology, Inc. and Solbourne, frankly concede that the Sparc technology may not be the best available. "From a technical point of view, Sparc is the worst," said Kam Chan, president of Tatung.

However, the vendors said, Sun's aggressive marketing and its ever-growing software catalog can offset any marginal technological advantage offered by RISC rival Mips Computer. "Whether or not you feel comfortable with Sun, it's a very effective marketing machine," said Doug MacGregor, chairman and chief executive officer at Solbourne.

A spokesman for Pyramid Technology Corp., which uses the Mips architecture, said technol-

ogy is insignificant compared with business and marketing decisions. Primarily, Sun was seen by Pyramid as moving into its high-end marketplace, and Pyramid did not want to compete with the vendor, according to the spokesman.

Solbourne evaluated Mips, Sparc and Motorola architectures and found them all within 5% of each other, with Mips having the edge in performance. "If you have a choice, you'd pick the leader in both marketing and technology. But if you pick only one, you pick marketing," MacGregor said.

Tony Levy, product marketing manager for Unix/RISC at DEC, said Mips Computer's current processor is 50% more efficient than Sparc. "The faster a chip set has to operate [to overcome lack of efficiency], the more power requirements you have and the more heat exchange necessary. Thus, it's harder to design small workstations around it," he said. DEC also owns a minority share of Mips Computer stock.

J. A. SAVAGE

HP unveils interface for Sun systems

BY J. A. SAVAGE
CW STAFF

Users of Sun Microsystems, Inc.'s workstations will have the choice of the Open Look or Motif graphical user interface with a software package introduced by Hewlett-Packard Co. last week. HP also unveiled a high-end personal computer and several networking devices, including a long-range hub using fiber optics.

HP stands to further Motif as an interface standard by porting its Visual User Environment package to Sun's Scalable Processor Architecture-based workstations.

While Motif is endorsed by the Open Software Foundation (OSF), Sun has stubbornly kept to its interface, Open Look. Sun

officials, including Chief Executive Officer Scott McNealy, have said that sticking to Open Look is a matter of principle for the company and that Sun wants nothing to do with OSF. OSF is led by HP, IBM and Digital Equipment Corp., all Sun rivals in the workstation market.

HP also made several hardware announcements last week. It introduced the Vectra 486/33T PC aimed at network support. Ranging in price from \$9,499 to \$17,799, the 14.4 million instruction per second system can support 200 local-area network users or 100 Unix terminals, HP said.

HP is expanding its networking line with seven modular products, including an HP Fiber Optic Hub. The device can serve eight floors or eight buildings us-

ing fiber-optic wire, according to an HP spokesman.

From a main fiber connection, twisted-pair cable is used for local networking. The hardware does not yet support a new router standard protocol, called open shortest path first, although HP is in support of that standard, according to Carolyn Ticknor, general manager at HP's Roseville Networks Division.

HP is also offering network management software called Openview Hub and Bridge Manager. This DOS-based system is currently stand-alone. It cannot be managed by other management software, said Bob Frankenberg, vice president of HP's Cooperative Computing Group. "Eventually it will be integrated" into other vendors' network management, Frankenberg said.

Compaq RISC plans leave users wary

BY RICHARD PASTORE
CW STAFF

While the ink may not be on the contract yet, Compaq Computer Corp. clearly has pen in hand and will sign up for RISC technology, industry observers confirmed last week. However, some are already questioning the value and viability of a Compaq reduced instruction set computing (RISC) system.

Nili Young, an analyst at Meta Group, Inc. in Westport, Conn., said Mips Computer Systems, Inc. chief scientist John Hennessy told her late last month that only volume supply questions were delaying an agreement between Mips and Compaq for a single-chip RISC design.

Compaq was working on a RISC system in its own laboratories last year, apparently trying and failing to build a RISC machine to support DOS, said Jim Poyner, a market analyst at William K. Woodruff & Co. in Dallas.

Hanging in

However, reports of talks between Compaq, Mips and Microsoft Corp. indicated Compaq has not given up. Indeed, one user who asked for anonymity said Compaq representatives recently told him the firm is working toward minicomputer- and mainframe-level processing, "including things like RISC."

A Mips spokeswoman said the R4000 RISC chip is expected to ship by midyear, and volume supply is not currently a concern. The company will not comment on any discussions with Compaq. Compaq also refused to comment.

While a RISC system might fit with Compaq's growth plans, it might not fit with those of users. Several Compaq Systempro users said they have no foreseeable need for RISC. Others using Sun Microsystems, Inc. or Digital Equipment Corp. RISC architectures said they saw no need to switch.

At sites where RISC is under consideration, the Compaq name on a RISC box would not guarantee a sale. "Compaq's known for their quality, but they're also known for their prices. They would be just another vendor we'd give consideration to," said Jack Mellon, manager of MIS planning and architecture at Ryder Truck Rental in Miami.

A major kink in Compaq's RISC plans could also be distribution. In light of Compaq's slow start with its advanced technology Systempro, the firm may have trouble pushing RISC boxes through its dealer-only channel, observers said.

"I don't know how many dealers are satisfied enough with their return on their Systempro investment to go into the RISC marketplace," said Michael Drips, senior strategist at US Sprint Communications Co. in Kansas City, Mo.

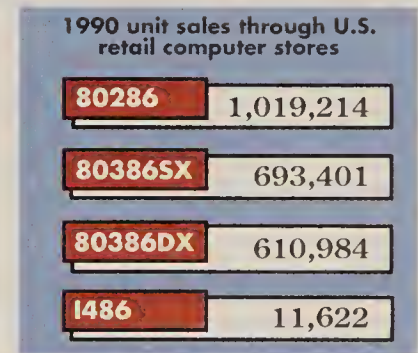
Compaq dealers were hardly gung-ho at thoughts of RISC. "It's not something we would want to jump into. We're not in a position now psychologically or economically to be a pioneer," said Ed Michelson, a partner at a San Diego Computerland Corp. franchise.

"Customers are not telling us they want RISC machines right now," Michelson added.

Users and dealers said they

Power glut

A survey of several hundred U.S. computer stores indicates dealers are having only marginal success in selling high-powered personal computers based on Intel chips



Source: Storeboard CW Chart: Doreen St. John

would be more interested if Compaq came up with a RISC processor that runs DOS, OS/2 or Microsoft's Windows derivations and their myriad associated applications. Unix, the current de facto RISC operating system, supports far fewer business applications.

Microsoft, which has announced plans to port its upcoming Portable OS/2 and Windows 3.2 to RISC, has reportedly been in discussion with both Mips and Compaq. "Microsoft's involvement would make a difference," said Matt Fitzsimmons, owner of a Computerland franchise in White Plains, N.Y. "If it was a DOS-based high-end workstation, it would definitely be of interest to us."

However, at least one user was dubious about the immediate worth of a DOS RISC system. Because today's Intel Corp.-based applications were designed for complex instruction set systems, they would not fully use RISC's speed advantages, said Sean McLinden, director of systems development for the decision systems laboratory at the University of Pittsburgh. "It would make more sense for Compaq to go with a Unix environment," he said.

NEWS SHORTS

HP airs upbeat report

Citing strong sales of its Laserjet printer, international demand for computers and internal cost-cutting, Hewlett-Packard Co. last week reported quarterly profits up 18% over last year and a 10% increase in revenue. Orders were up by 20% internationally and only 3% in the U.S. The report surprised analysts, including John Girton at Van Kasper & Co. in San Francisco, who had projected less than half the profit growth.

Core States' executive resigns

The executive responsible for electronic product services at Core States Financial Corp. in Philadelphia resigned last week. Chief Operating Officer Bipin C. Shah resigned effective March 1 as part of a larger reorganization at the \$23.5 billion regional bank. Shah was promoted from executive vice president of operations and technology last year. A company spokesman declined to comment on reasons for the departure. Executive Vice President Douglas Anderson took over the electronic processing services, which include Core States' automated teller machine network and point-of-sale and merchant processing services.

SPA settlement due

The Software Publishers Association (SPA) is expected to announce a \$300,000 settlement today, its largest ever in a software copying case. The SPA conducted a search-and-seizure raid on Davy-McKee Corp.'s Chicago office Nov. 19, 1990, on behalf of Wordperfect Corp., Lotus Development Corp. and Software Publishing Corp. The case was settled last week. As part of the settlement, Davy-McKee, an international construction engineering firm, must audit all personal computers at its nine U.S. locations, and the SPA will be allowed to conduct annual audits of Davy-McKee for the next two years. Davy-McKee is the first company with multiple offices to be raided by the SPA.

Coke's Currid forms consultancy

Cheryl Currid, a highly visible spokeswoman for downsizing applications, has left her information systems position at Coca-Cola Co.'s Foods Division to consult on downsizing. Currid, 40, resigned as director of applied information technology to form Currid & Co., a Houston-based consultancy. Paul Wilson, the division's vice president of information services, refused to comment on a possible successor.

Apple unveils handwriting system

Apple Computer, Inc. recently began customizing its computers to the Japanese market and unveiled the \$70 Machandwriter, which recognizes handwritten Chinese and Japanese characters as well as the Roman alphabet. The product was developed by Communications Intelligence Corp. in Menlo Park, Calif., according to Apple Chairman John Sculley.

Adapso picks dispute overseer

Adapso, the computer software and services industry association based in Arlington, Va., announced last week the appointment of Philadelphia-based Judicate, Inc. to administer an "alternative dispute resolution" program for the industry. Judicate is a national private court system that uses retired judges and independent specialists to resolve legal disputes.

Firebomb attempt on IBM Germany

A branch office of IBM's subsidiary IBM Germany was the scene of an arson attack early last Wednesday morning. The Freiburg, Germany, office — which was hit with a crude gasoline bomb — sustained minor damage, and there were no injuries, according to an IBM spokesman. IBM said authorities are investigating the incident, adding that nobody has yet claimed responsibility. Security measures are in place worldwide, but further comment might compromise them, according to the IBM spokesman.

NCR's new ESOP could diminish AT&T threat

BY MICHAEL FITZGERALD
CW STAFF

DAYTON, Ohio — NCR Corp. last week started what one analyst called a game of "chicken" with AT&T in a bid to stave off the telephone giant's takeover effort.

NCR said it will hold on the same day both its regular annual shareholders meeting and a special meeting of its shareholders to vote on an AT&T-sponsored measure to oust NCR's board. The company also created an employee stock ownership plan (ESOP) that could lessen AT&T's ability to gain enough votes to oust NCR's board.

NCR set March 28 as the date for both meetings. The special meeting was requested by NCR shareholders through a proxy sponsored by AT&T.

AT&T's ability to oust NCR's entire board may be weakening. Last week, AT&T extended its tender offer to April 30, 1991, saying the number of shares tendered had fallen from approximately 70% to 66%. Some analysts, such as Dean Witter Reynolds, Inc.'s Jay Stevens, said they think this is a natural effect of a rising stock market. Others said NCR's stock price increase is causing the dip.

However, the dip, combined with the ESOP, which gives 8% of NCR to its employees, could signal that AT&T will not get the 80% vote it needs to oust NCR's board at the special meeting.

"I think that the ESOP move is going to make it more difficult

for AT&T" to replace NCR's board, said David Schofield, an analyst at Duff & Phelps Investment Research Co. in Chicago. Schofield said he thinks NCR may have scheduled the two meetings back to back in hopes that an NCR win in the special meeting could carry over to the regular meeting, in which AT&T would need only a simple majority to remove the four directors up for re-election.

If the surge in stock prices continues, AT&T may be forced to sweeten its offer for NCR.

Analysts contacted said the current market, while not vindicating NCR management's repeated demand for \$125 per share, made \$90 per share look less generous.

"Between the move in the market for tech stocks and the additional impediments that NCR has thrown in [e.g., the ESOP and the quick meeting date], if AT&T really wants this company, it's becoming more clear that they're going to have to come across with more cash," Scofield said.

NCR also paid out a special \$1 per share dividend to shareholders last week. NCR said it would ordinarily have used the money to repurchase shares, but the takeover effort has "prevented" it from doing so.

State of siege

AT&T's battle to buy NCR has become a lengthy siege. The following is a chronology of the struggle:

- **Nov. 15:** AT&T Chairman Robert Allen telephones NCR Chairman Charles E. Exley Jr. asking for a meeting. They meet at the Cincinnati airport to discuss Allen's merger proposal.
- **Nov. 19:** Allen sends Exley a letter confirming the offer of a friendly merger in an \$85 per share stock swap.
- **Nov. 30:** Exley sends a "Dear Bob" letter to Allen rejecting the bid but saying NCR would consider a higher bid.
- **Dec. 2:** AT&T announces its negotiations with NCR and says it will offer \$90 per share, or \$6.12 billion, in stock.
- **Dec. 5:** Exley says NCR's board will consider a price of \$125 per share for the company. AT&T initiates hostile bid.
- **Dec. 13:** NCR's board rejects the \$90 per share bid.
- **Jan. 2:** AT&T sends a second proxy asking NCR shareholders to request a special meeting of NCR's board.
- **Jan. 16:** AT&T announces it has received tenders for more than 70% of NCR's shares; extends tender offer to Feb. 15.
- **Jan. 22:** NCR files an antitrust suit against AT&T.
- **Jan. 24:** The Federal District Court of New York rules that NCR must give its stockholder list to AT&T.
- **Feb. 18:** AT&T extends its tender offer to April 30; tendered shares have dropped to 66%.
- **Feb. 21:** NCR adopts ESOP, which will own 8% of the firm.

Nationwide ISDN predicted for 1992

BY JOANIE M. WEXLER
CW STAFF

The "islands of ISDN" in existence today are slated to blend into a nationwide archipelago by year's end 1992, according to the Corporation for Open Systems International's (COS) ISDN Executive Council.

The council said it will officially announce this week an implementors' agreement among switch vendors, the regional Bell operating companies (RBOC) and Bellcore, the RBOCs' research and development arm, that will result in interconnected Integrated Services Digital Networks becoming available to a significant number of users across the country by the end of next year.

The ISDN Executive Council, which comprises RBOCs, switch vendors, computer manufacturers and user companies, was

formed a few months ago by COS "because the industry needed an executive-level focus on the issues surrounding ISDN," said Mike Walter, vice president of marketing and corporate services at COS.

ISDN's ultimate *raison d'être* is to give users worldwide, dial-up voice, data and video services over the public telephone network at speeds of up to 1.544M bit/sec. The technology has been slow to mature because of interoperability glitches and the major task of upgrading the world's telecommunications infrastructures. Users, then, have been limited to communicating with others who have ISDN service available in their areas.

Various ISDN players have now apparently agreed, however, to upgrade equipment to a common implementation of CCITT-sanctioned ISDN standards. The move should allow

"full interconnection of voice and circuit- and packet-switched traffic," said Joe Gustafson, director of ISDN market planning at Nynex Corp., an ISDN Executive Council member.

"This will greatly expand the geographic coverage of ISDN and thus increase the technology's application possibilities," he said. More companies being able to link up with each other on the fly for voice, data and video communication parallels the state of the facsimile market, Gustafson explained.

"One fax machine is useless. Two fax machines are useful. A million fax machines have a million uses," Gustafson said.

"The big barrier to widespread ISDN deployment has been interoperability. This is a signal that the problem will be resolved shortly," said a spokesman for Bell Atlantic Corp., which is also a council member.

Banyan need not despair — yet

IBM/Novell deal poses a marketing challenge, not a technological threat

BY JOANIE M. WEXLER
CW STAFF

For the short term, it appears that local-area network company Banyan Systems, Inc. need not wring its hands over IBM's and LAN market leader Novell, Inc.'s recent partnership power play.

Users and industry analysts acknowledged that IBM's and Novell's licensing and resale agreement poses some marketing and perception challenges to Banyan's position as the "enterprise" network vendor. But, they added, the firm's Virtual Networking Software (Vines) will for some time remain a choice operating system for large networks.

"The Novell/IBM relationship reaffirms my decision to stick with Banyan," said Jonathan Oski, a senior technical engineer at the Boston branch of Bank of Tokyo. "The partnership clouds the future of LAN Server and what IBM and Microsoft are doing with OS/2."

IBM and Novell announced two weeks ago that IBM would immediately begin reselling and providing direct support for No-

vell's Netware 286 and 386 operating systems in addition to LAN Server [CW, Feb. 18]. LAN Server is a fruit of IBM's long-time development relationship with Microsoft Corp.

In addition to reselling Novell software, IBM said, the companies will work together to port Netware to IBM's OS/2 and RISC System/6000 platforms. "If anything, the relationship will slow down the Netware development because of having to penetrate layers of IBM bureaucracy to get a product out the door," Oski said.

Clinging to Vines

Linda DuRussell, a communications programmer at Pennsylvania Blue Shield, recently selected Vines to run on the token-ring LANs her company is installing. She said the market's turn of events — including Novell's planned mid-March rollout of Netware V3.11, which includes several wide-area enhancements — has not altered her opinions.

"I wouldn't want to be a pioneer with what Novell and IBM are promising. It sounds nice, but how it will actually work is yet to be seen," she said.

With its Streettalk global naming service and robust wide-area communications protocol support, Banyan has historically had a technical foot forward in enterprise networking over work group-oriented Novell. The routing tables within

Streetwork, for example, allow users to log onto a network just once to access all network services.

Novell and IBM have not yet announced a retaliatory solution to Streetwork, stating only that they would eventually link their proprietary directory services with the "open" X.500 protocol.

Scott Stein, director of client/server research at Technology Investment Strategies Corp., a Framingham, Mass.-

based market research firm, predicted that "when others get close to competing with Streetwork, Banyan will get sucked up by another company."

Stein estimated that Vines accounted for 6% of the worldwide personal computer LAN node shipments in 1990. He said an average multisite Vines installation supports about 1,500 nodes, while Netware generally spans about 500 nodes in large, dispersed companies and 350 nodes in medium-size firms.

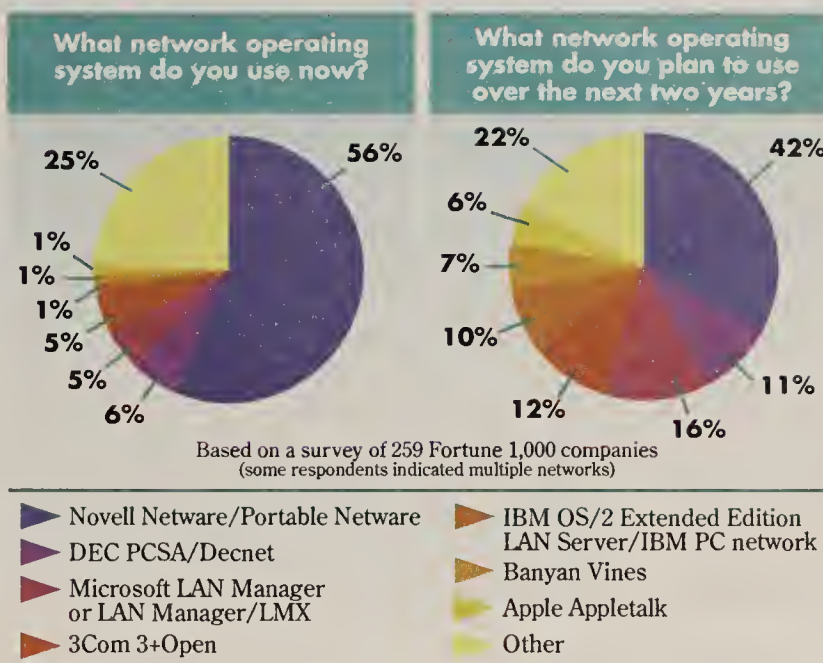
Because Netware does not offer a global directory service, users on a Novell network must relog on to access network services residing on different work groups.

While Banyan has been technically ahead in the wide area, it has been weak in marketing its products. In fact, Banyan officials have in the past acknowledged that when they created Vines, they thought "the technology would sell itself."

"Banyan needs to get the word out that its architecture was built from the ground up for wide-area networking based on LANs," asserted Hub Vandervoort, president of Horizon Strategies, Inc., a consultancy in Brookline, Mass. "Netware was created for the work group, and IBM really doesn't view the LAN as the basis for a wide-area backbone," he said.

Net diversity

Netware faces a host of challengers to its dominance of the corporate networking market



Source: Business Research Group

CW Chart: Doreen St. John

LAN users

FROM PAGE 1

The attractions of the routers, users said, include better LAN-to-LAN cost/performance than an IBM front end, support of popular LAN and high-speed wide-area protocols and, lately, even SNA support.

With a peer-to-peer SNA platform, IBM is just starting to address LAN users' priorities.

Testing the waters

The Travelers Corp. tried out IBM's recommended solution of using an existing backbone of IBM 3745 front ends to interconnect LANs.

Such a configuration is especially attractive to large IBM shops because it allows them both to leverage an existing SNA backbone and to avoid setting up a separate, high-speed network

just for LAN connections.

The more LAN traffic Travelers put on its 3745s, however, the less satisfactory was the front end's performance, according to Robin Layland, manager of SNA software engineering.

Even more serious to Travelers' users was the front end's inability to interconnect LAN applications that were not based on SNA. Many key business applications in use on Travelers' LANs are based on LAN protocols such as Novell, Inc.'s IPX and IBM's Netbios, Layland said.

IBM is reaping the bitter fruits of its inability to sell its LU6.2 as a de facto standard for personal computer LANs. Introduced approximately five years ago, the peer-to-peer SNA protocol has never kicked its reputation among users as a memory hog or its reputation among applications developers as hard to work with. Both Ernst & Young

and Forrester Research estimated that LU6.2 use makes up less than 5% of total SNA traffic in IBM shops.

Best laid plans . . .

Even if information systems has big plans for SNA and LU6.2, IBM may still run into resistance from companies whose LAN installations are "bottom-up phenomena driven by business units and individual departments," said David Passmore, a principal at Ernst & Young.

At the New York Metropolitan Transit Authority, for example, a central IS department handles SNA communications for several large IBM mainframes and is experimenting with LU6.2 software from Spectrum Concepts, Inc. as a way to download demographic and geographic data to PCs, according to data center manager John Vito.

However, Robert Kirschen-

baum, manager of the authority's information center, said integrating the LANs he manages with SNA "is not a main concern of mine at the moment."

Currently in the process of migrating some 550 to 600 users from Wang Laboratories, Inc. systems to PCs on Novell

Netware LANs, Kirschenbaum said his "main problem is connecting all of the LANs to support station-to-station communications" among agency users. He added that his group recently implemented a Cisco Systems router to coordinate traffic among the different sites.

IBM's to-do list

Among items high on IBM's work list for SNA systems are the following:

- Revamp the IBM 3745 to better support demanding LAN-to-LAN, peer-to-peer communications. The front end will eventually support 1G bit/sec. speeds as well as broadband industry standards, a spokesman said.
- Provide interconnectivity for other LAN protocols besides IBM's LU6.2 on an SNA backbone. On Sept. 5, 1990, IBM addressed this problem with the new LAN-to-LAN over Wide-Area Network program, which allows Netbios applications to communicate over an SNA network. The vendor is expected to add SNA support for other protocols, such as Novell's IPX.

Two weeks ago, IBM announced plans to resell Novell's Netware and provide interoperability between the operating system and IBM's OS/2 Extended Edition LAN Manager.

- Make LU6.2 more palatable to users and application developers. IBM is working on a "more streamlined, easy-to-use, memory-efficient LU6.2 on DOS," to be shipped within 1½ years.

In addition, IBM has promised to implement the Common Programming Interface for Communications (CPIC) on OS/2 by year's end. CPIC is an application programming interface for LU6.2 that is said to be easier to use than the current interface.

The real breakthrough will be when Novell delivers on its promise to support CPIC, the IBM spokesman said. This will enable applications based on Novell software to access resources across a peer-to-peer SNA network.

ELISABETH HORWITT

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TRENDS

CIO CHALLENGES

CIOs expect their IS budgets to increase by an average of 5% in 1991, but changing user needs and budget constraints are major challenges that could impact IS and its level of service

What percent do you expect your IS budget to change in 1991?

Percent of increase
(Respondent base: 614)

The health care and travel industries received the largest increases in their IS budgets in 1991. Engineering did not fare as well, experiencing slight cutbacks

| | |
|--------------------|-----|
| Health care | 10% |
| Travel and leisure | 10% |
| Distribution | 8% |
| Telecommunications | 8% |
| Financial services | 7% |
| Insurance | 6% |
| Retail | 6% |
| Banking/Thriffs | 4% |
| Energy | 4% |
| Transportation | 4% |
| Education | 2% |
| Manufacturing | 2% |
| Engineering | -5% |

Major challenges impacting IS services

(Responses are based on the most frequently stated answers)

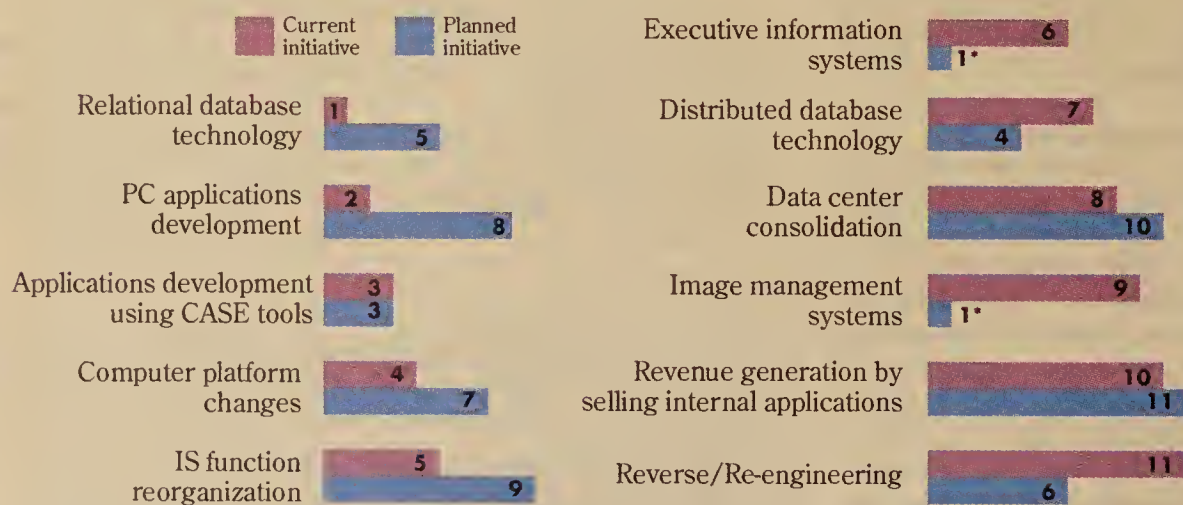
Staff turnover is not a threat to the value of IS, but budget constraints and evolving end-user needs are key challenges impacting levels of service

1. Budget constraints
2. Changing needs of internal customers
3. Resistance to change
4. Senior management commitment
5. Lack of internal customer involvement
6. Corporate bureaucracy
7. Effects of mergers/acquisitions
8. Lack of tools and techniques
9. Staff development
10. Inability to attract quality staff
11. Lack of methodology
12. Hardware technology limitations
13. Staff turnover

Major initiatives

Regardless of budgets or industry, the current focus of CIOs is in improving end-user productivity through developments in relational database technology and PC applications development tools

(Based on a scale of 1-11, where 1=most common, 11=least common)



*Equal number of responses

Source: Deloitte & Touche, Chicago

CW Chart: Tom Monahan

N E X T W E E K

Since its introduction last May, Microsoft's **Windows 3.0** has easily been the most talked about product in the world of computing, with a graphical interface that spells an end to the dreaded DOS prompts. But has it delivered more than just a pretty picture? Find out what corporate managers say in our Special Report: The Windows Payoff.



Randy Lyhus

Low-key but firm and progressive is the style of Southern New England Telephone's information systems department and general manager of IS and technology, Raymond Fletcher. Manager's Journal looks at how the growing regional phone company blends technology such as CASE and EDI with strong IS/user partnerships for a competitive edge.

INSIDE LINES

We've been consulting the Oracle

Oracle sources said they expect changes at the top during the coming weeks. Geoff Squire, president of Oracle's Worldwide Distribution Sales Division, is expected to be named chief operating officer. Chief Financial Officer Jeffrey Walker is expected to leave that post to take over Oracle's Applications Division. It's possible that these changes will free Oracle Chief Executive Officer and founder Larry Ellison to spend more time developing new products.

Perfect temps

Katherine Borsecnik, director of operations at the Software Publishers Association (SPA), told a packed house at the Chicago Association for Microcomputer Professionals that the SPA's first three raids in New York were based on evidence provided by the same person: a temporary worker who specialized in Wordperfect's word processor, Wordperfect. In each case, photocopied templates caused the temp to tip the SPA to possible illegal software use. Borsecnik joked that the temp was now in the SPA's witness protection program.

Dodge can now speak frankly

For most of us, last Monday was just President's Day; for the former president of McCormack & Dodge, it was also Independence Day. Frank Dodge said he celebrated the expiration of his one-year noncompete contract with Dun & Bradstreet Software by getting in touch with some of the folks "who have made approaches in the past year that I couldn't follow up on." Within the next few months, he said, look for him to head up, acquire or launch a software firm, "definitely in nonmainframe application software and definitely in Massachusetts."

Is this any way to intimidate?

IBM is expected next month to turn OS/2 systems into Advanced Peer-to-Peer Network nodes (see story page 1). But that will only be the beginning: During the next 60 days, look for IBM to announce a slew of interoperability alliances with vendors in the computer, network management, LAN, WAN, systems software and operating systems arenas.

Spotted on the radar scope

Ralph Ungermann was a mystery guest at Motorola's Radio-Telephone Systems Group's rollout of the Altair wireless Ethernet LAN during a recent conference. A guess as to why he attended might be that Ungermann-Bass' Access/One intelligent wiring hub is slated to support wireless Ethernets. Ungermann, who is founder, president and CEO of Ungermann-Bass, sanctioned Altair, saying it "gives customers more choices" and is "complementary" to cabled LANs.

Is it Memorex, or is it Fujitsu?

Memorex Telex Corp. is reportedly putting the finishing touches on a new disk drive to compete with the IBM 3390 high-end disk drive for 1992 delivery. The disk unit is built around an existing Fujitsu 3390-compatible drive, according to Paul Wolfstaetter, program director at Gartner Group's Enterprise Storage Strategies Group. Another Memorex product, a redundant array of inexpensive disks-type disk-array drive, should follow in late 1992, he said.

Foreign intrigue

Sometimes the solution to your problems is right in front of your nose; other times you have to fly halfway around the world to find it. IBM's OS/2 evangelist, John Soyering, flew to Australia last week to meet with a developer who has come up with "an interesting solution for integrating non-OS/2 clients into OS/2," a source said. If it works, it could show up in OS/2 Version 2.0, we're told.

Wyse Technology is considering sending end-user guides and computer manuals to customers on floppy disks or as a loaded program in the hard drive of its computers, according to company executive Bob Goodman, director of channel marketing. You, too, can cut down on paper by contacting us via our electronic mail drops: 76537,2413 on Compuserve; MHTS78A on Prodigy; and COMPUTERWORLD on MCI Mail. Or you can contact News Editor Pete Bartolik by phone at (800) 343-6474 or zap to our fax at (508) 875-8931.



AT&T introduces the biggest thing to hit contact lens sales since shag carpeting.

AT&T Integrated Services Digital Network (ISDN) gave Bausch & Lomb the capability to take 1,000 more orders per week.

Ask most people what AT&T ISDN has to do with the contact lens business and they'll probably tell you it's the first line on the eye chart. But if you ask the people at Bausch & Lomb, they'll tell you about a digital technology so innovative, it lets them answer a lot more calls using the same number of live operators they had before.

Not too long ago, Bausch & Lomb's

customer service center was getting a lot more calls than they could handle. Realizing that lost calls can turn into lost customers, they called AT&T for help.

Through AT&T ISDN, Bausch & Lomb got a feature called Automatic Number Identification (ANI). With ANI, their computers can automatically capture each caller's phone number and match it to the customer's record. The end result? Call handling time has been cut by an average of four seconds per call. Which means

Bausch & Lomb's customer service representatives can now handle about 1,000 more weekly calls than they could before.

So if you've been looking for a way to boost sales without taking on more overhead, call off the search. AT&T's contact lens solution could be the answer for your business, too.

Innovation. Another AT&T advantage.

For more information about AT&T ISDN, call your AT&T Account Executive or 1 800 247-1212, Ext. 144.



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